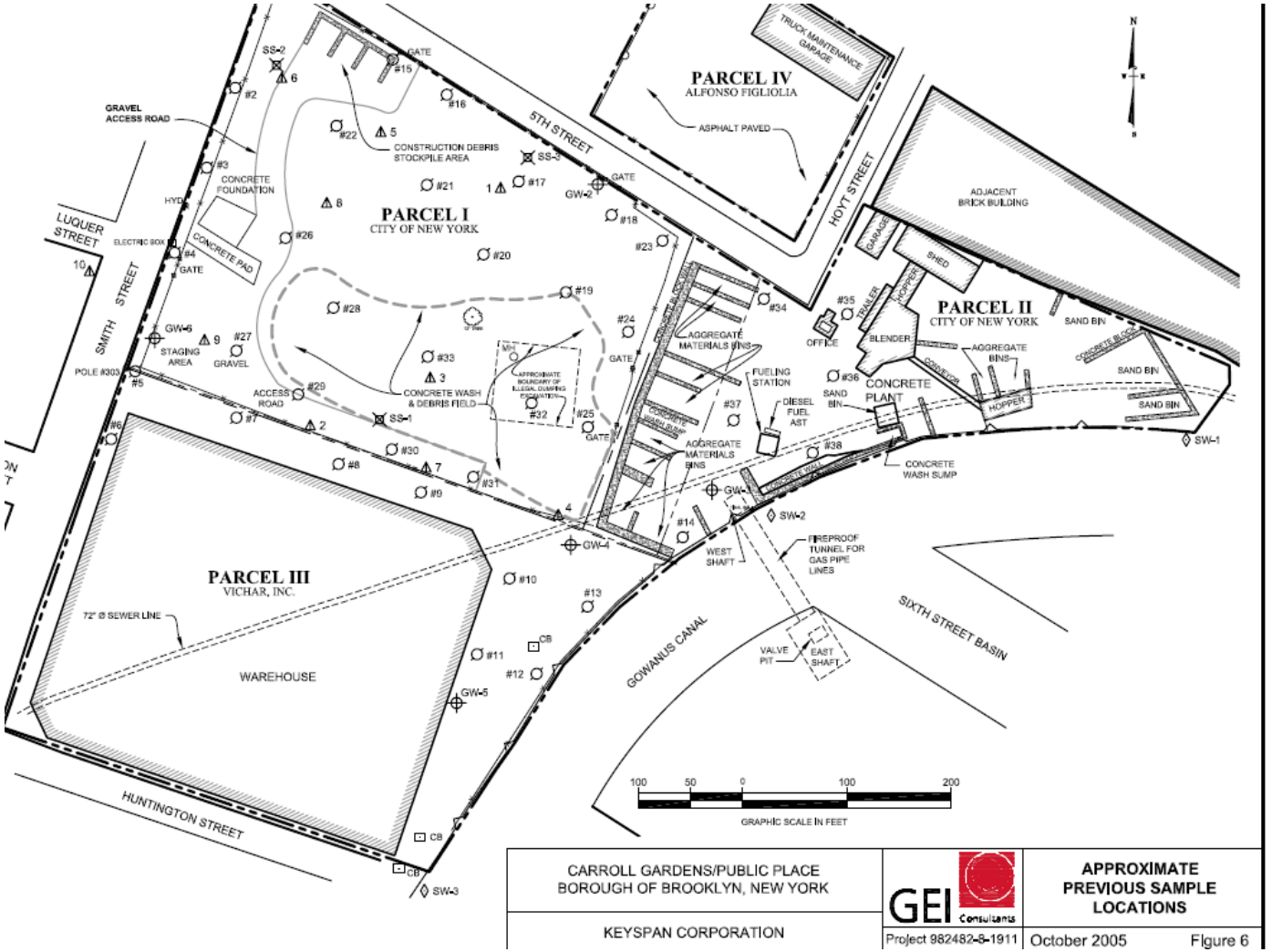
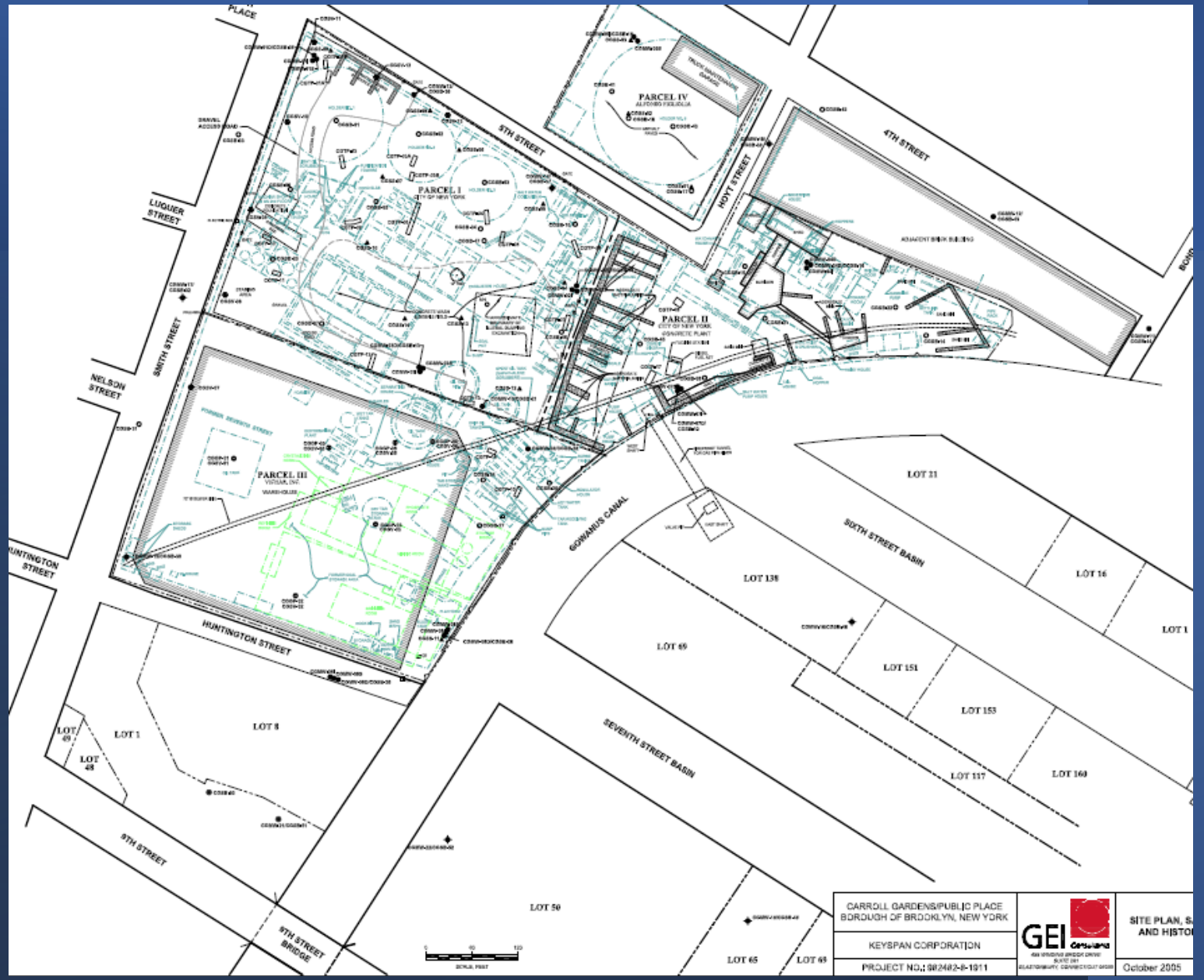
Public Place Parcels

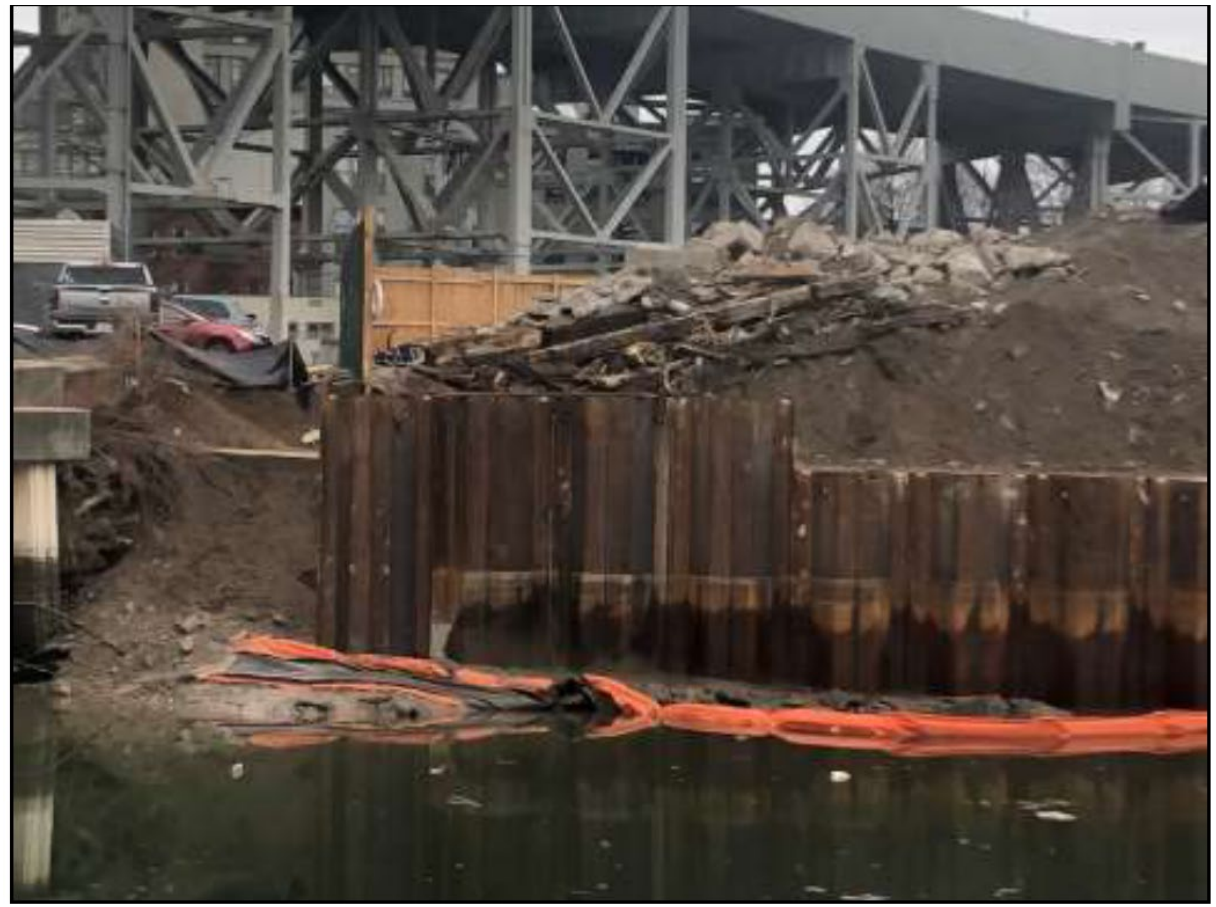



PARCEL I
PARCEL II
PARCEL III
PARCEL IV
5TH STREET
4TH STREET
HOYT STREET
LUQUER STREET
SMITH STREET
NELSON STREET
HUNTINGTON STREET
GOWANUS CANAL
SIXTH STREET BASIN
SEVENTH STREET BASIN
9TH STREET BRIDGE
LOT 11
LOT 16
LOT 1
LOT 138
LOT 69
LOT 151
LOT 153
LOT 117
LOT 160
LOT 8
LOT 49
LOT 48
LOT 50
LOT 65
LOT 68
CARROLL GARDENS/PUBLIC PLACE
BOROUGH OF BROOKLYN, NEW YORK
KEYSPAN CORPORATION
PROJECT NO.: 992482-8-1911
GEI
October 2005

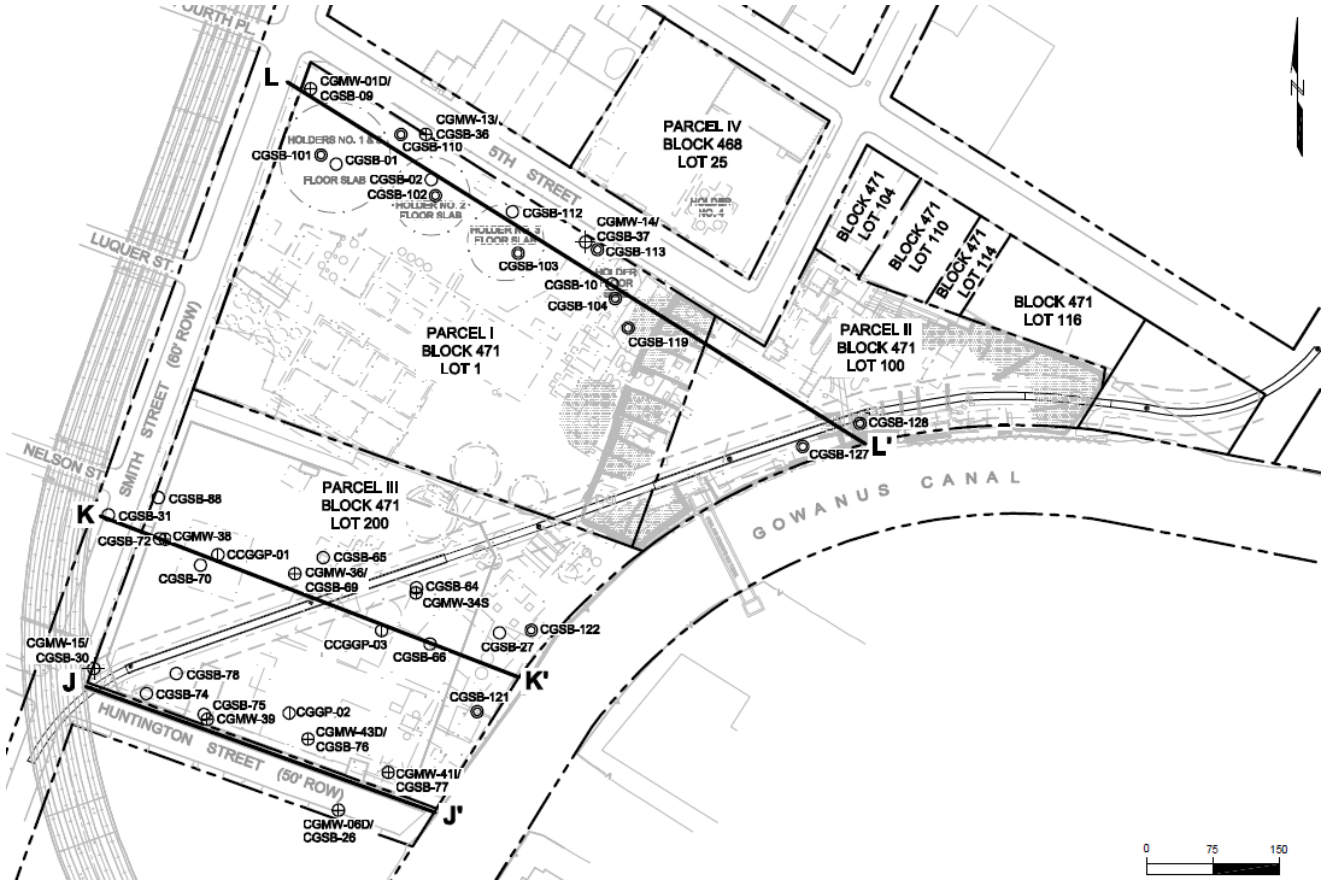
Private new bulkhead south of Public Place

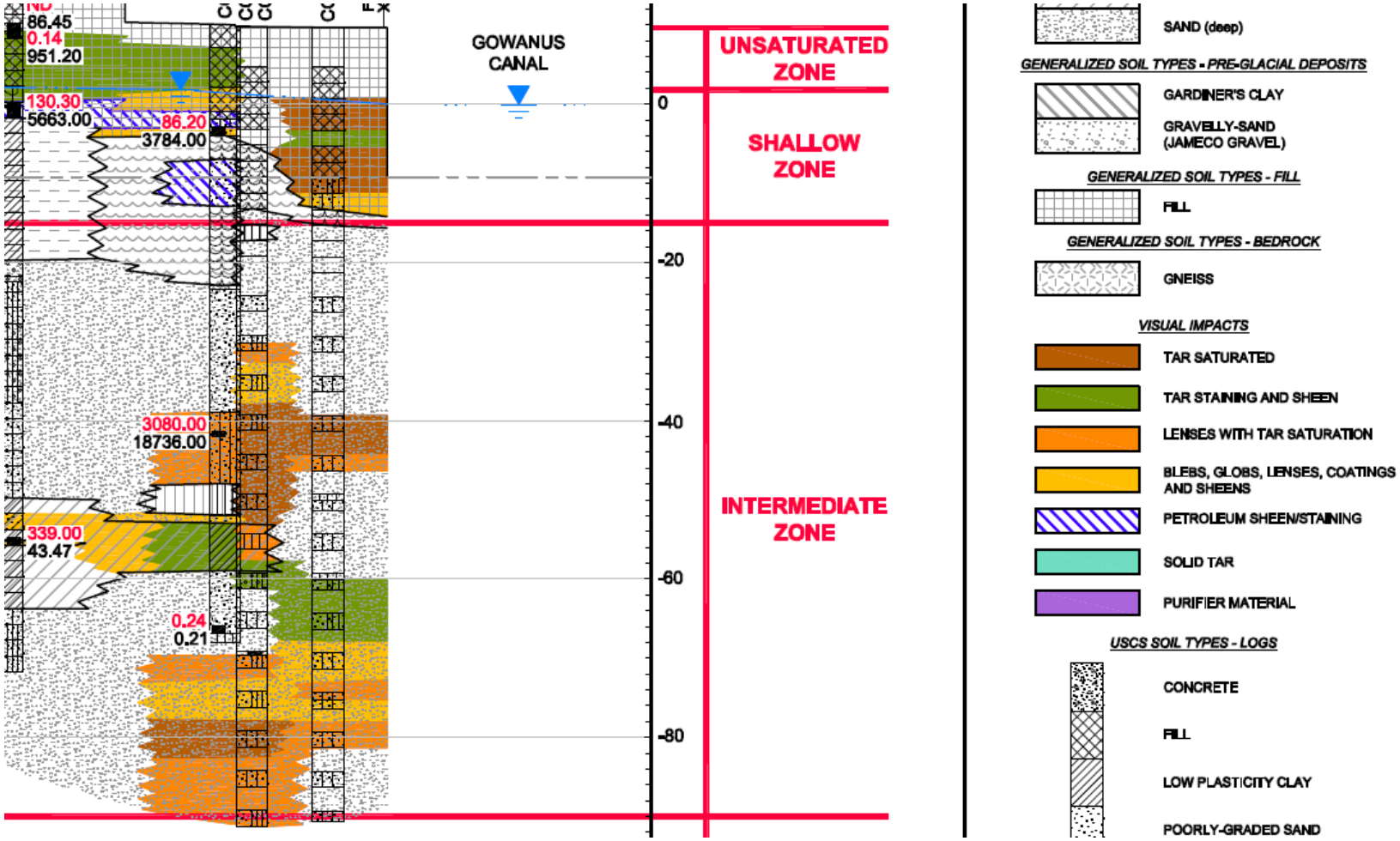
Photo 3: View of bulkhead (facing west)

Photo 3: View of bulkhead (looking north)



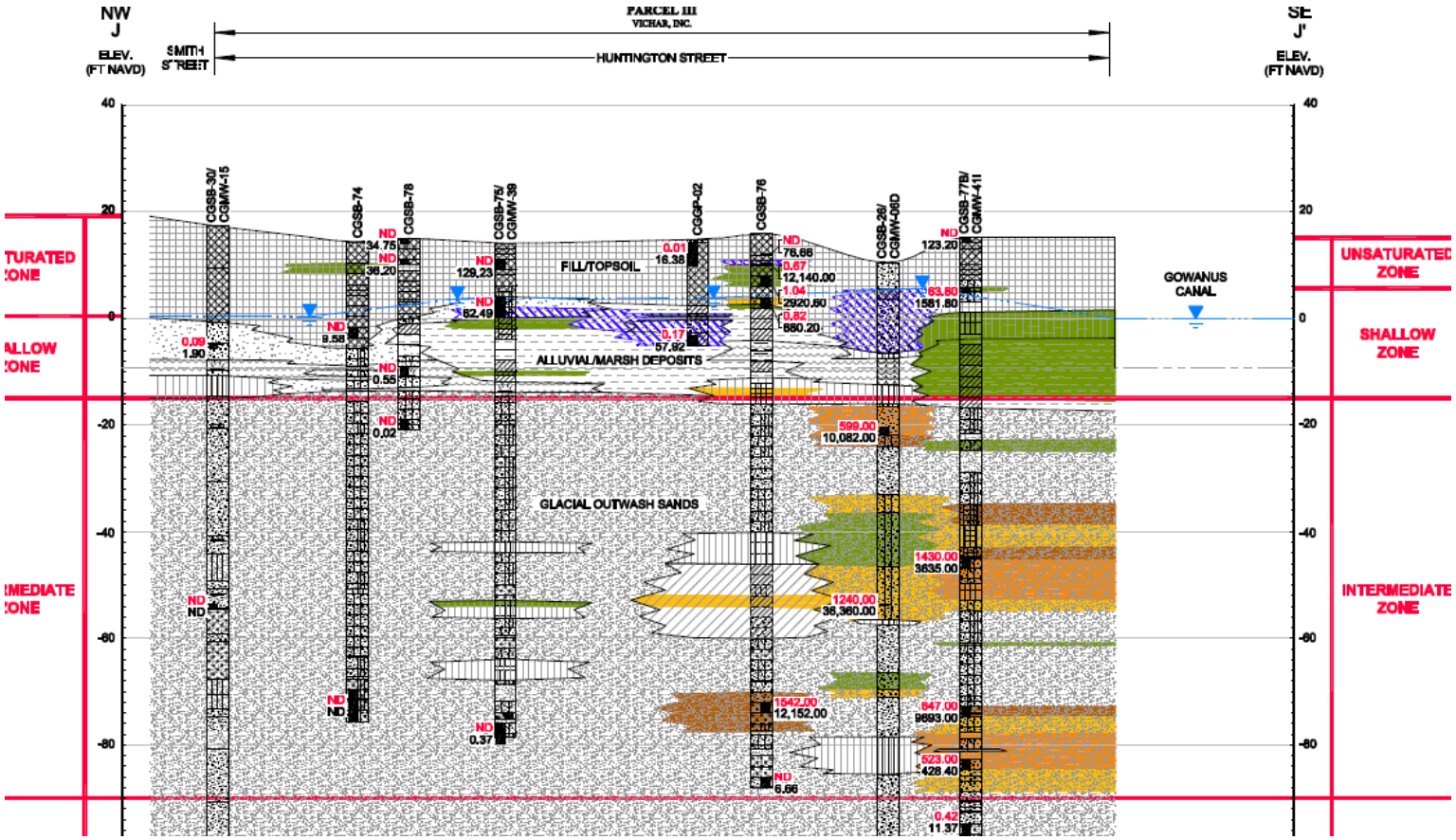
Public Place Cross Sections



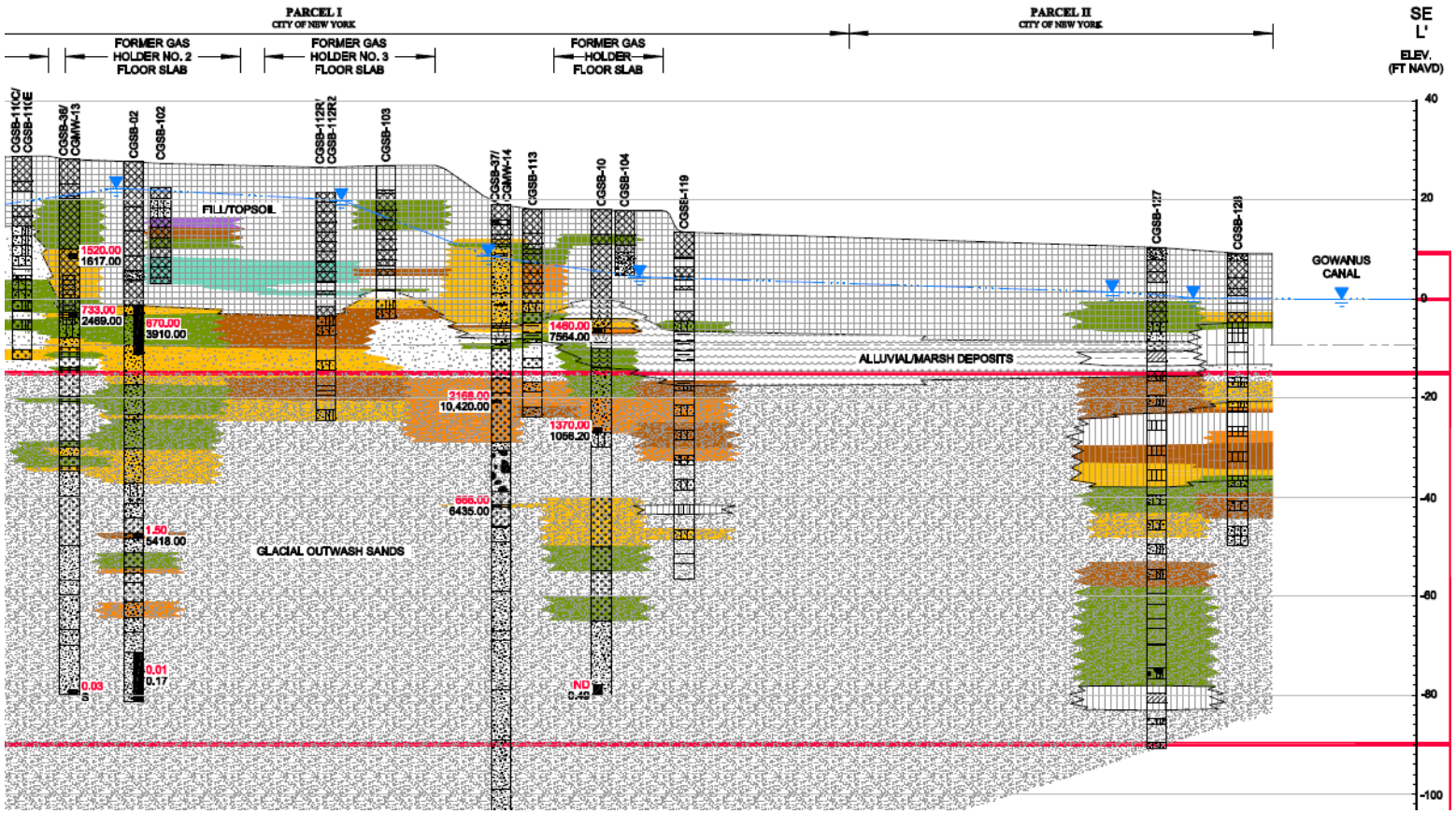


Color codes for tar contamination

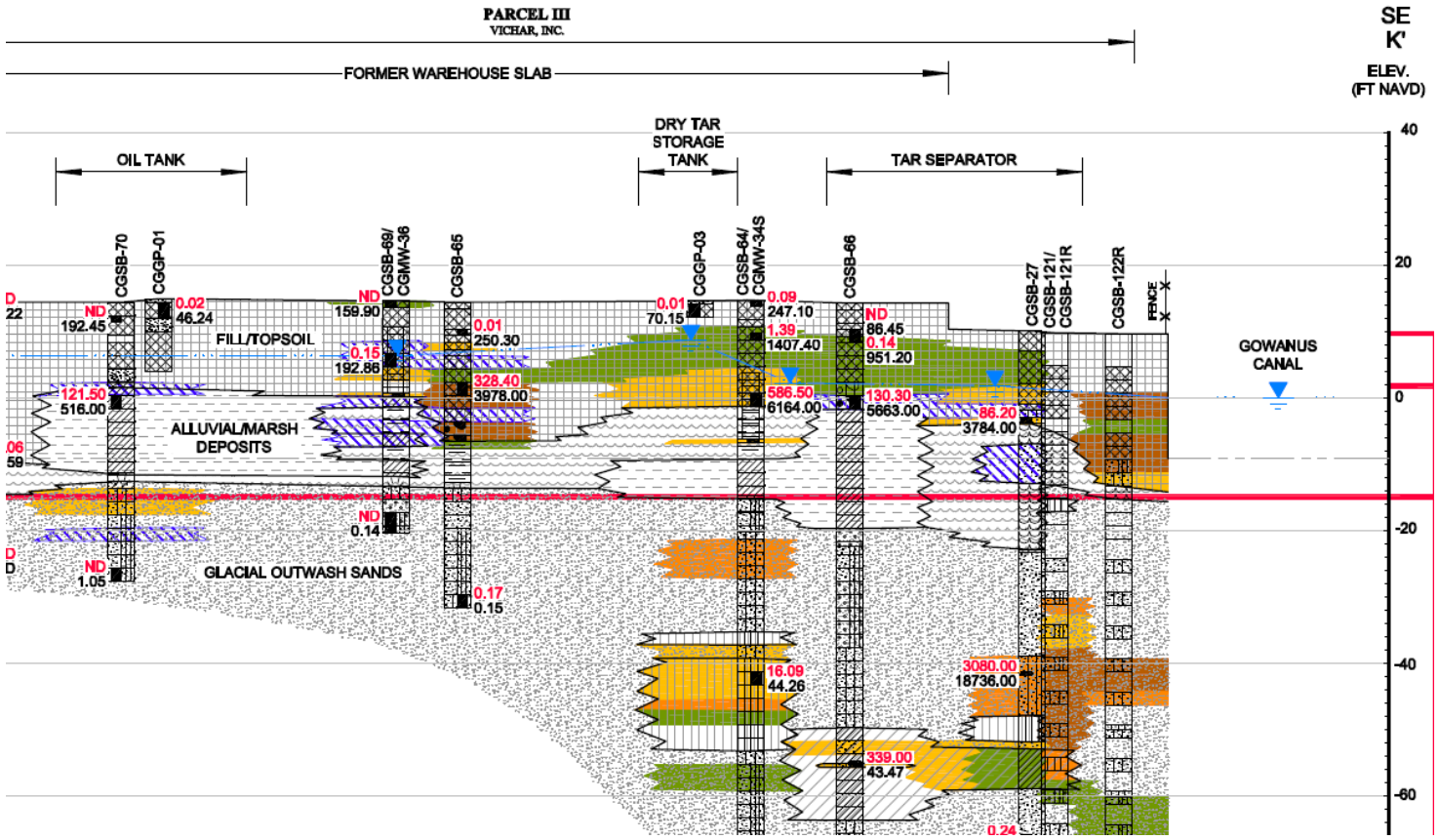
Cross section along Huntington Street



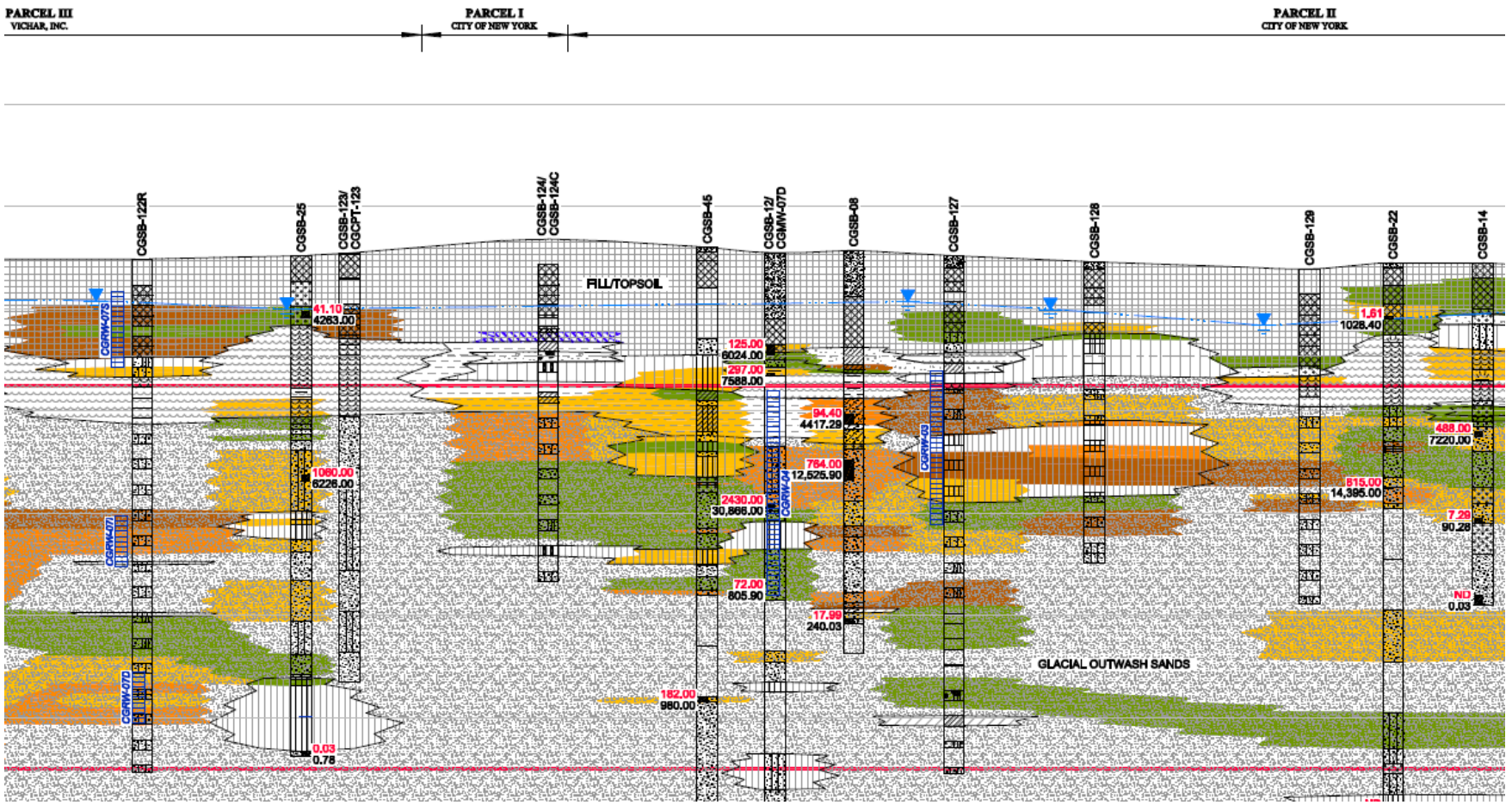
Cross section along Northern boundary



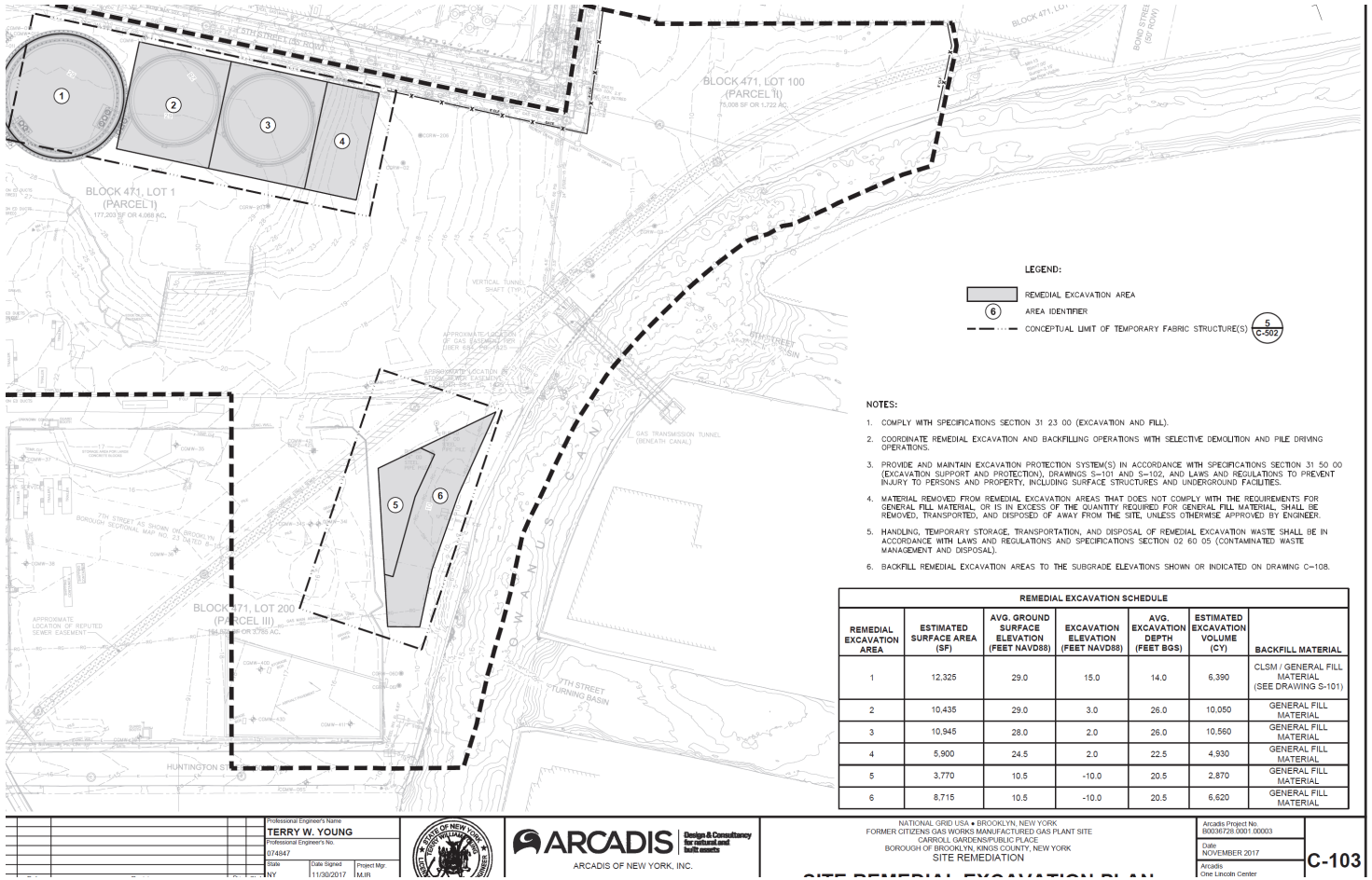
Cross section along Parcel III

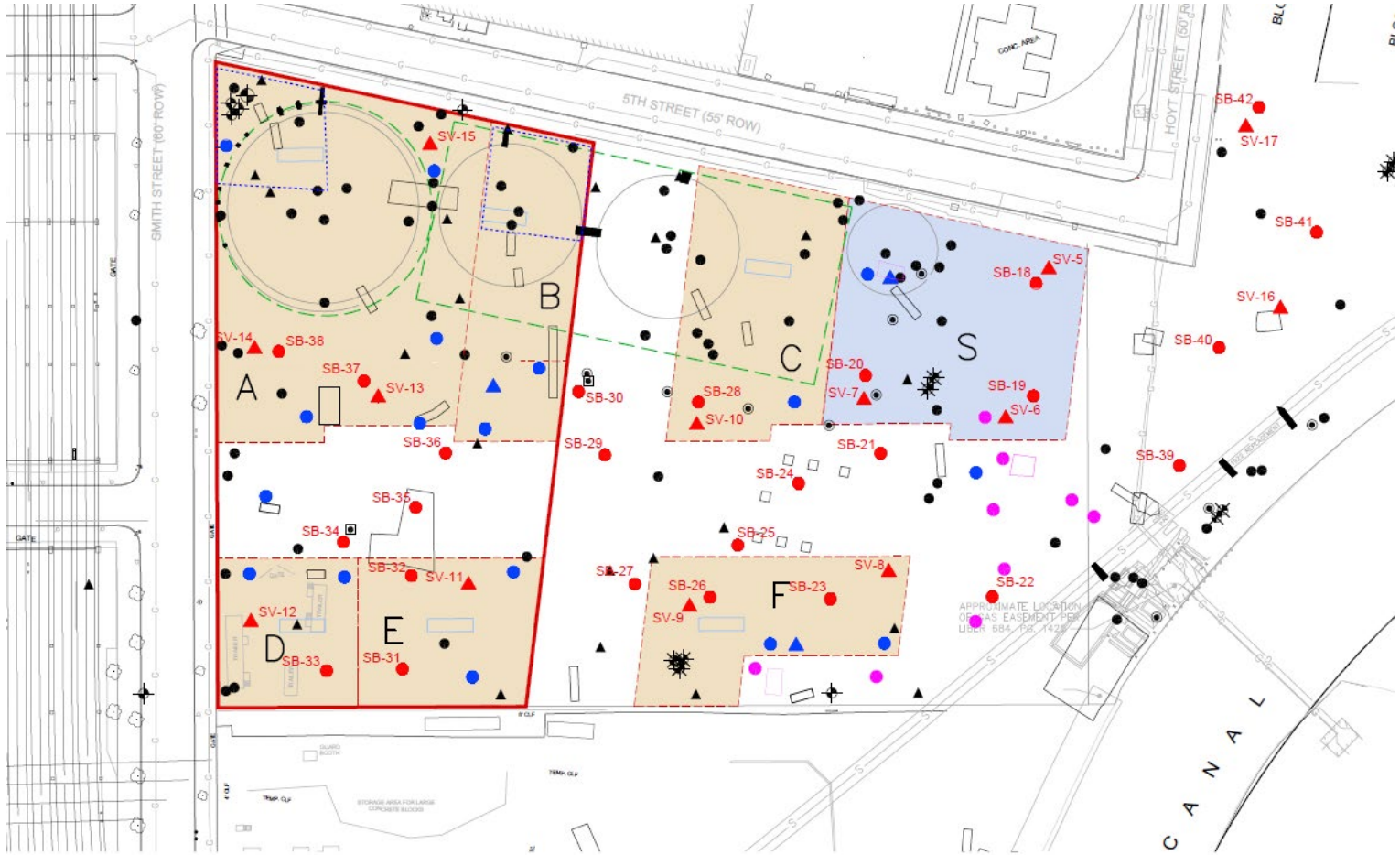


Middle of E-E’ along canal bank

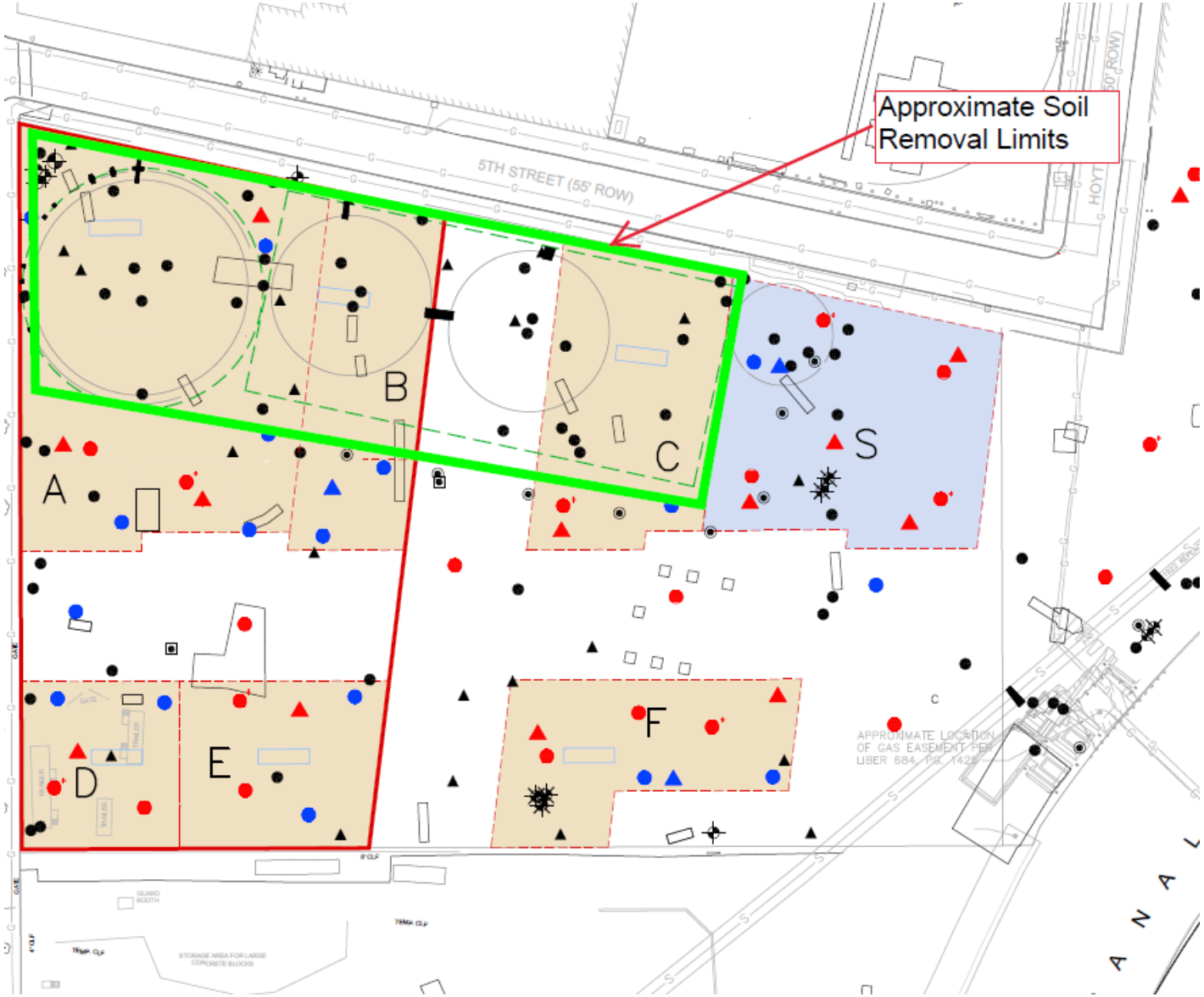


Excavation areas and depth of

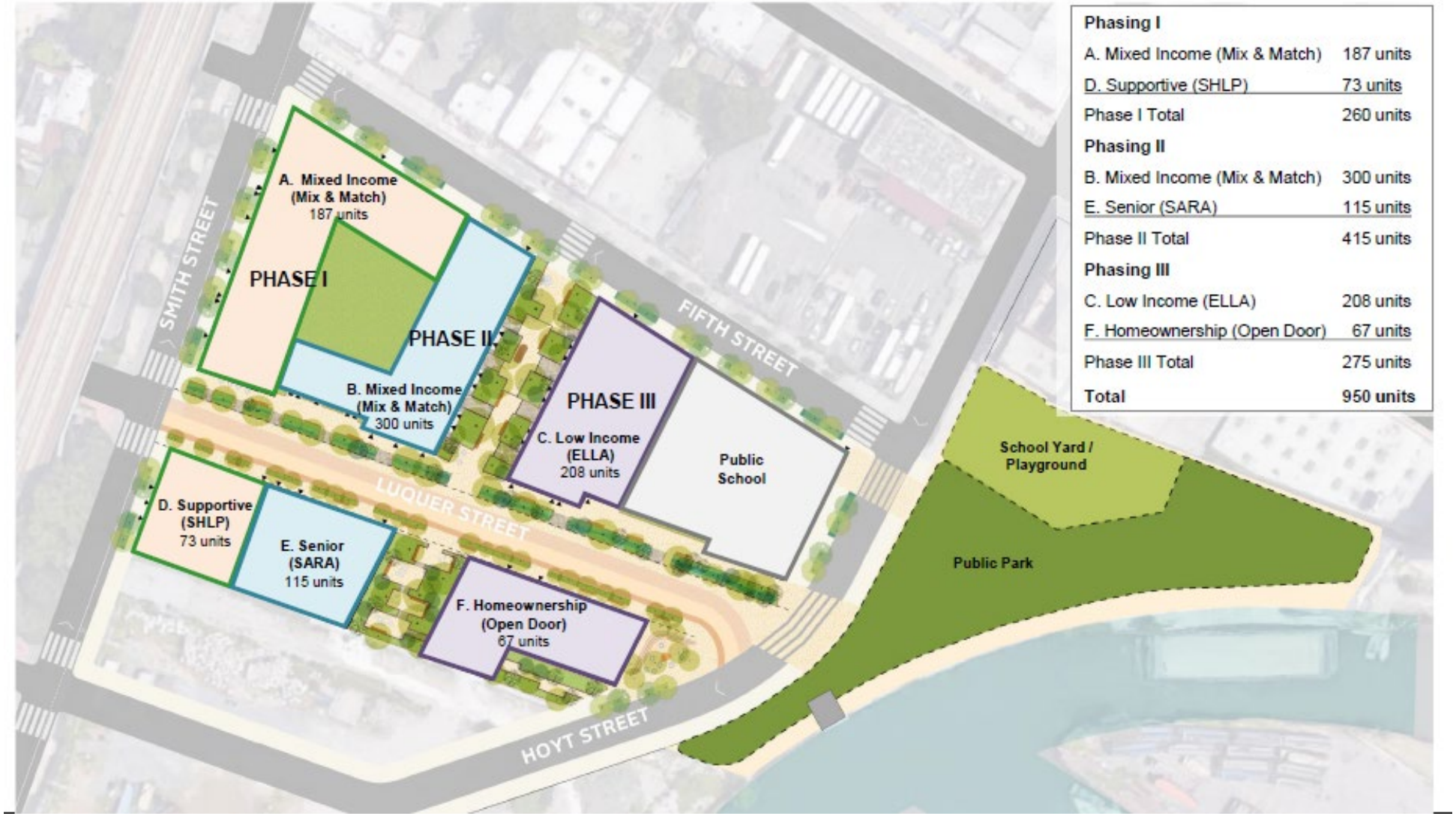




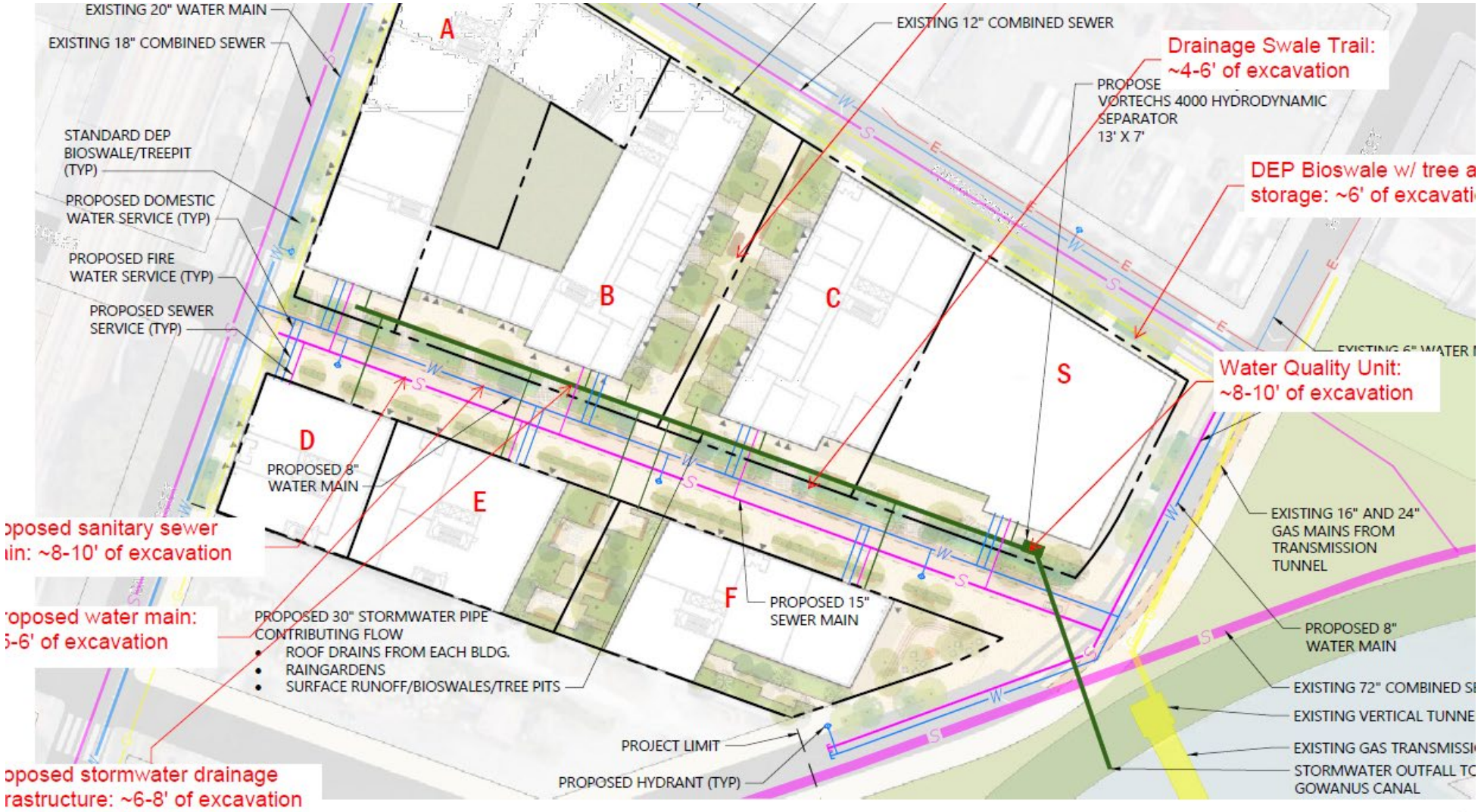
Developers' Investigation Plan


Approximate Soil Removal Limits
5TH STREET (55' ROW)
A
B
C
D
E
F
S

PROPOSED AFFORDABLE HOUSING PHASING PLAN



Phasing I	
A. Mixed Income (Mix & Match)	187 units
D. Supportive (SHLP)	73 units
Phase I Total	260 units
Phasing II	
B. Mixed Income (Mix & Match)	300 units
E. Senior (SARA)	115 units
Phase II Total	415 units
Phasing III	
C. Low Income (ELLA)	208 units
F. Homeownership (Open Door)	67 units
Phase III Total	275 units
Total	**950 units**

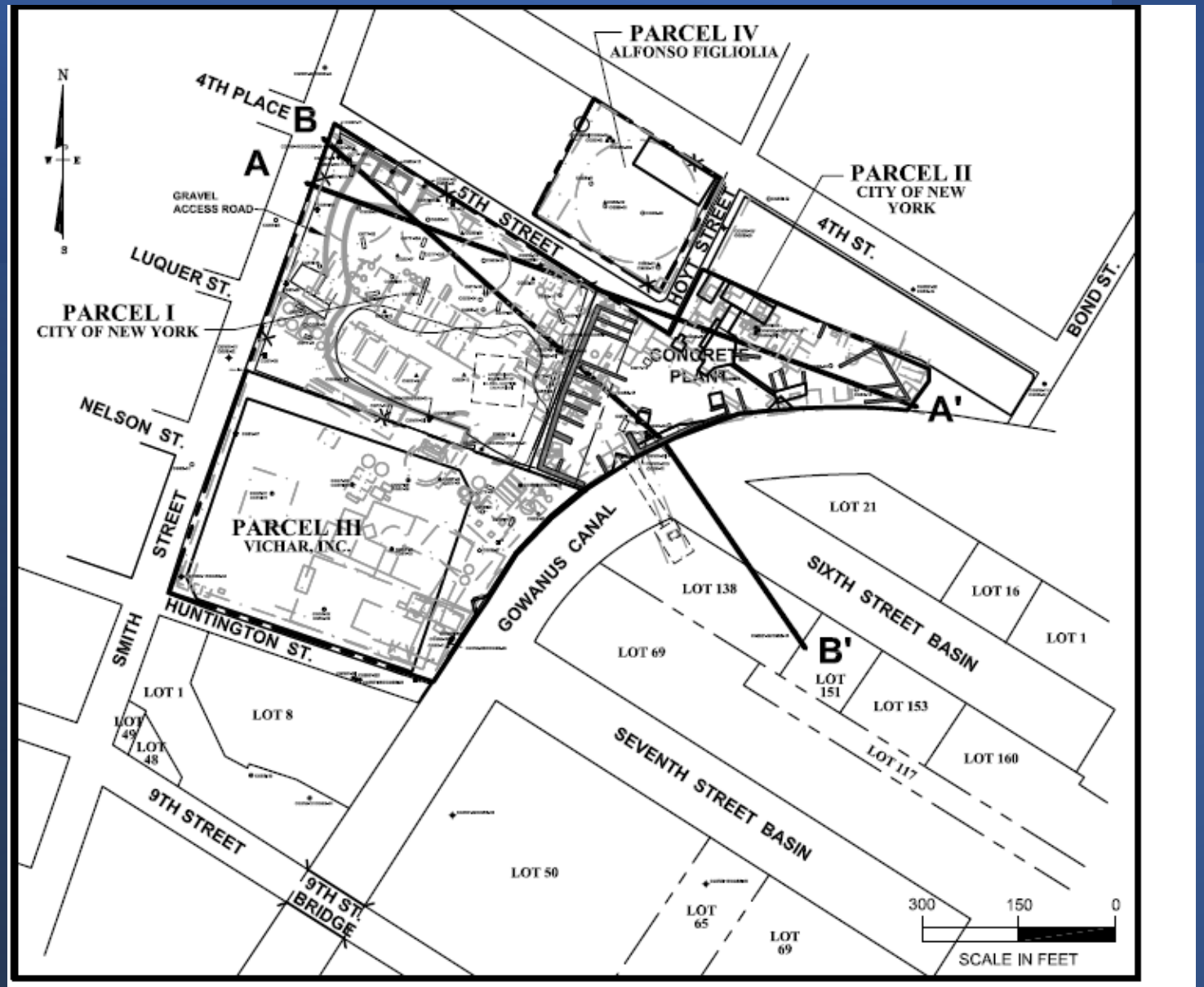


Gowanus Green Utility Plan

0 30 60 120 Feet

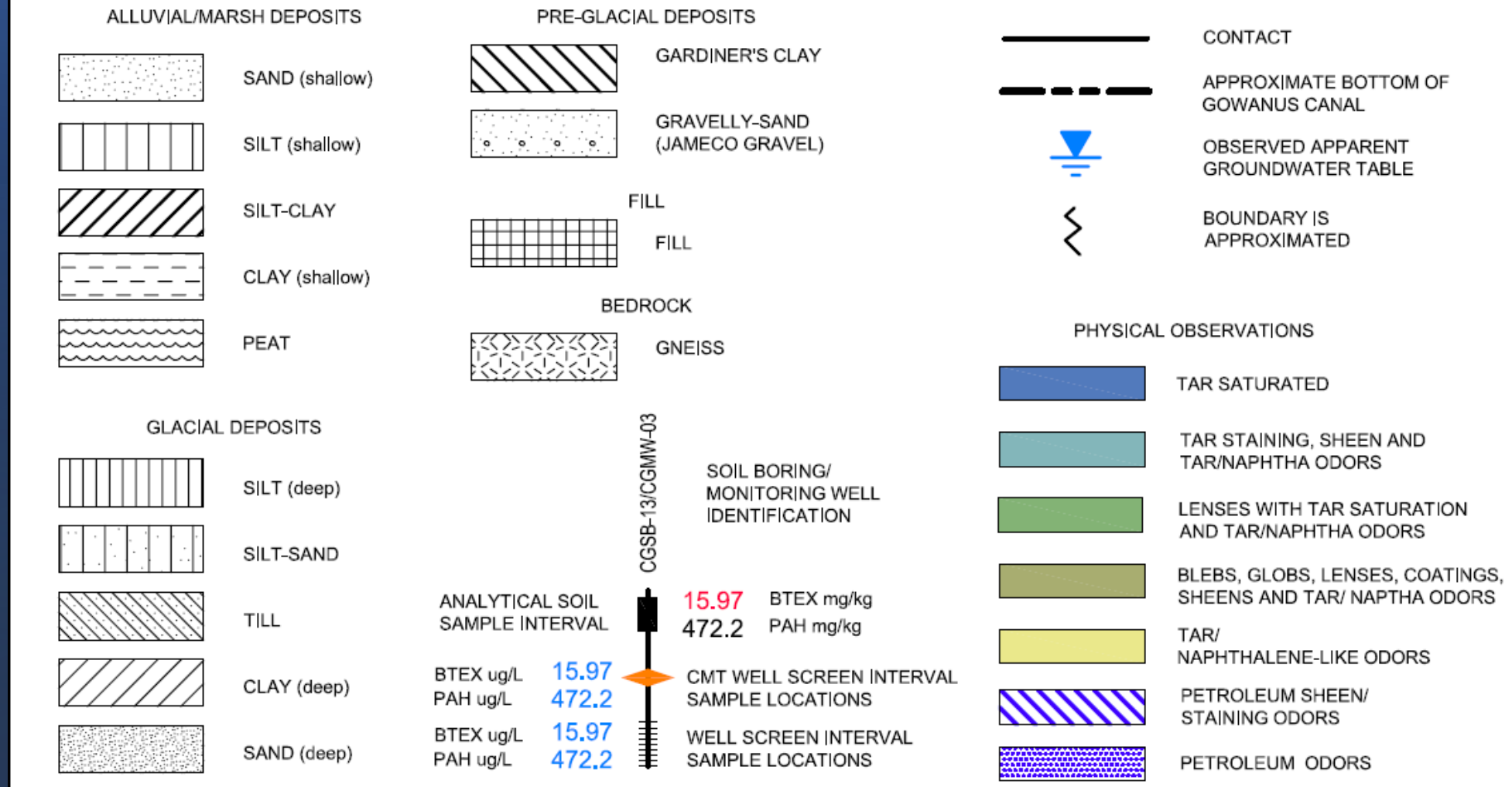
Cross Sections from GEI Public Place RI

Extent of Tar contamination

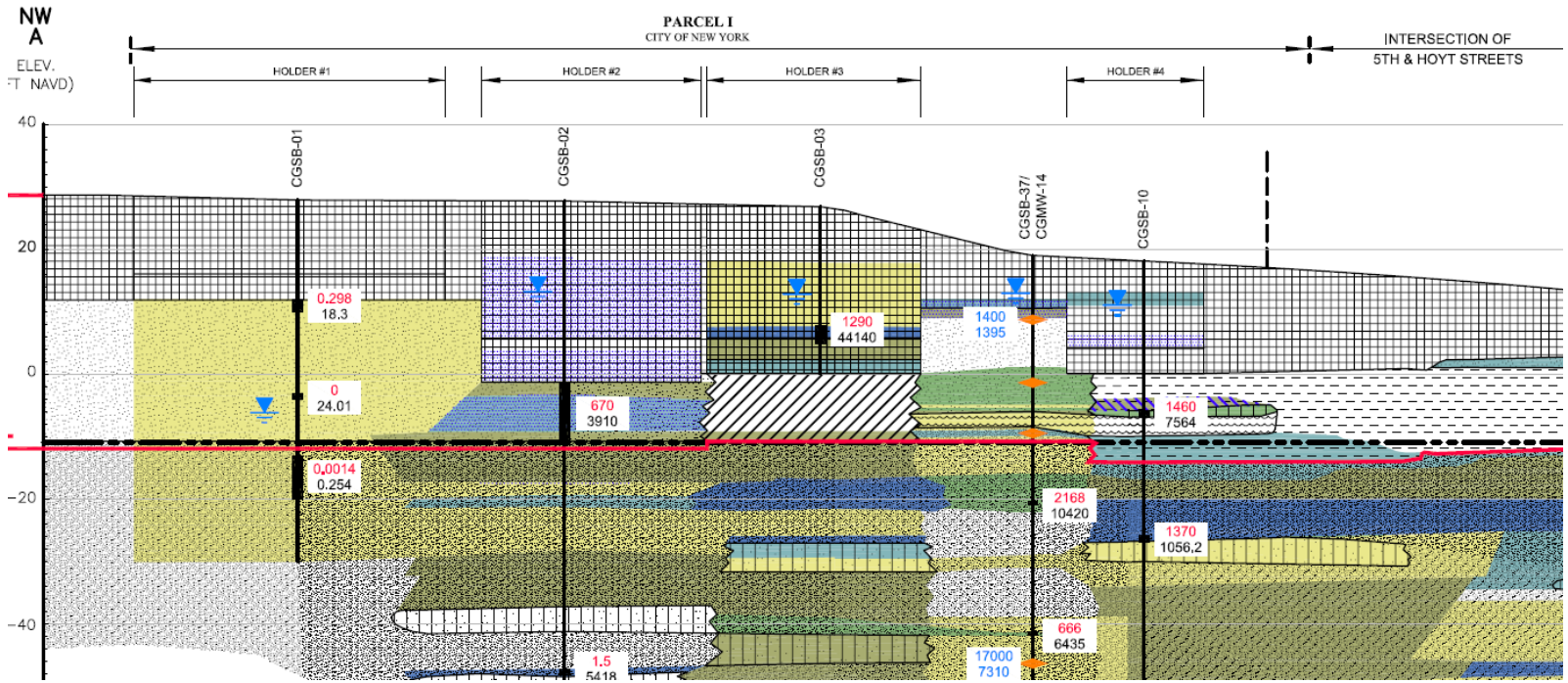


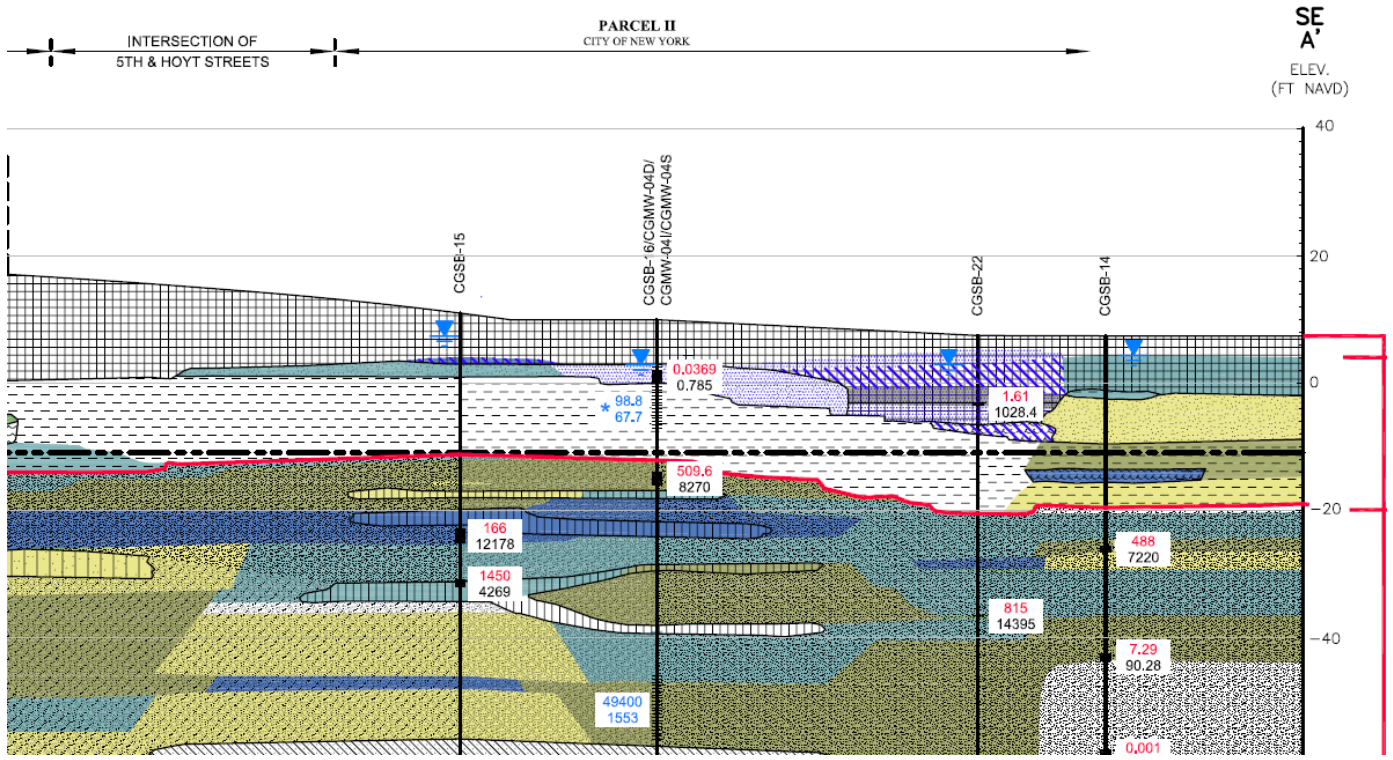
CROSS SECTION LOCATIONS

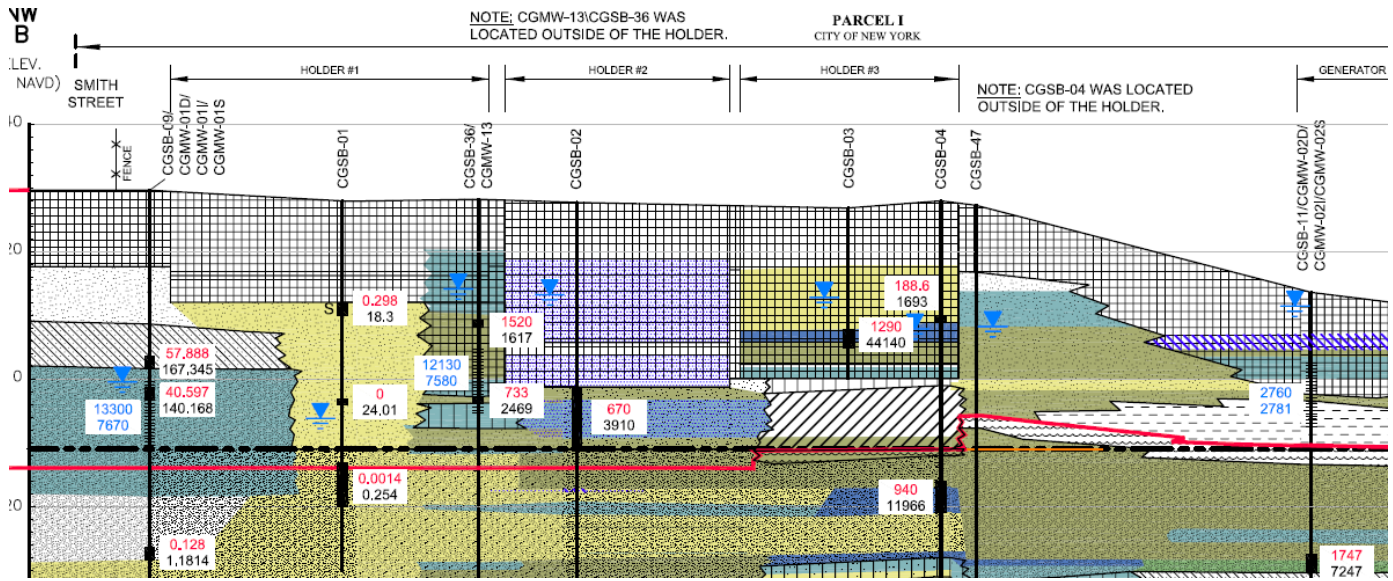
LEGEND

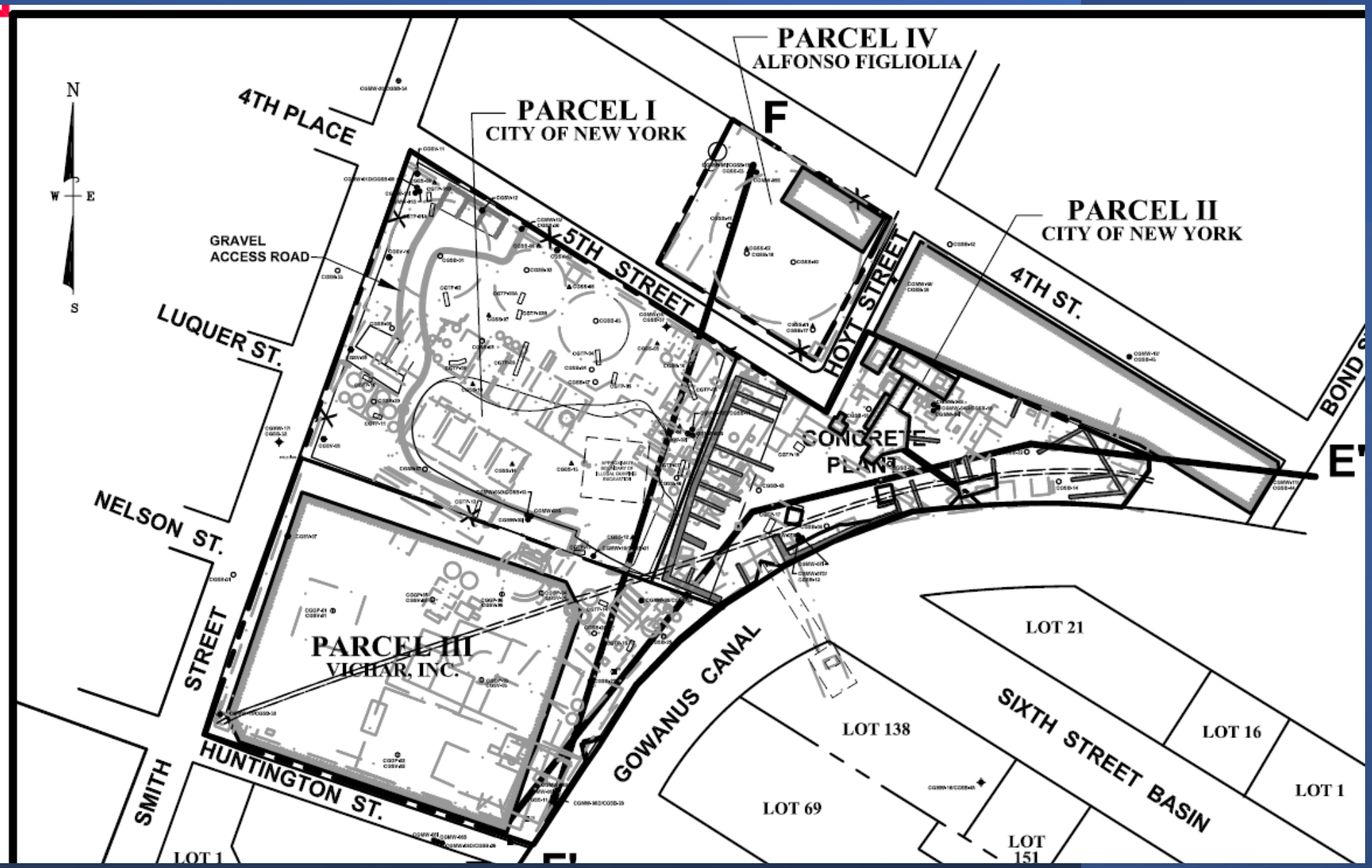


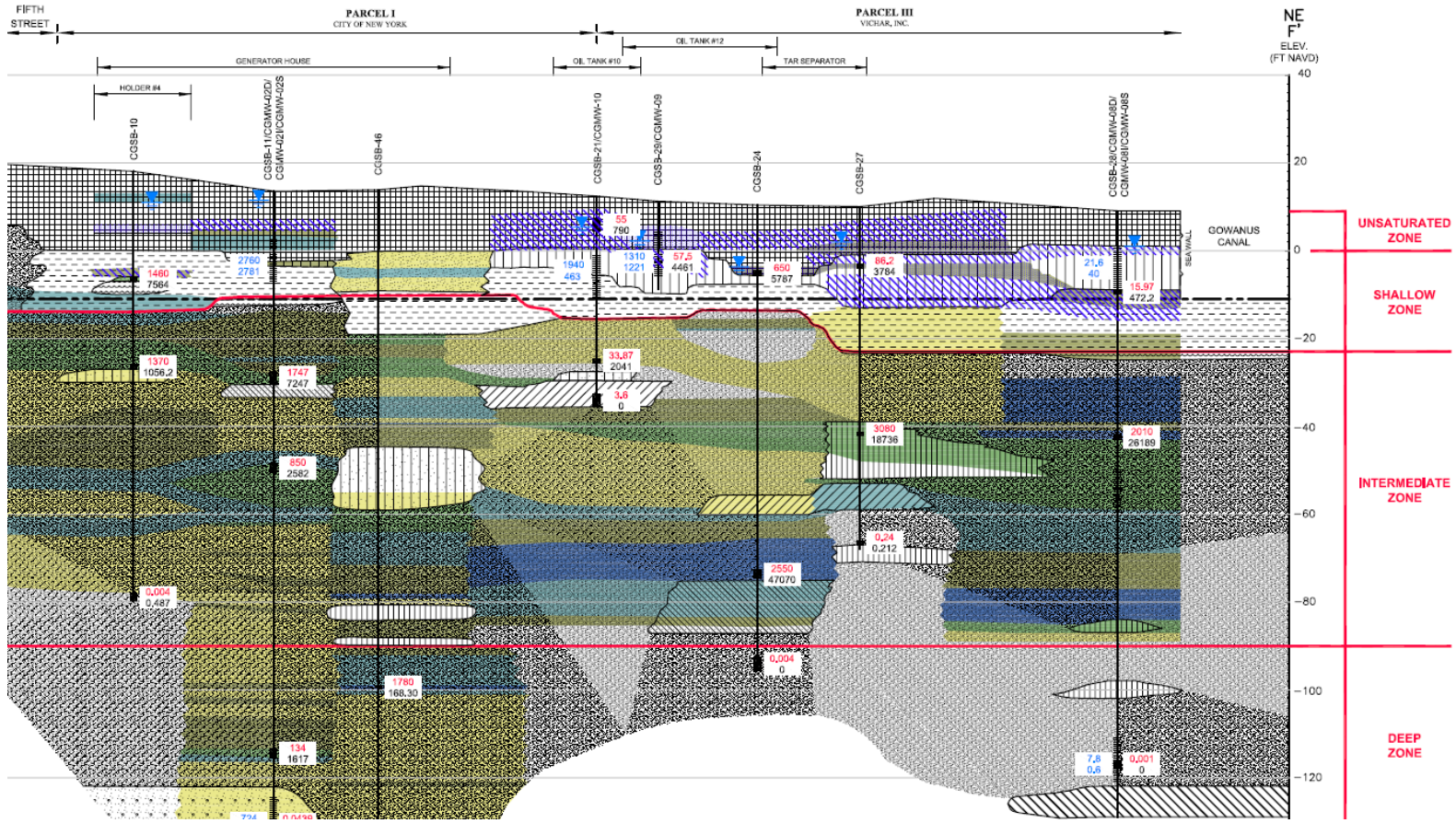
* GROUNDWATER DATA FROM 2003 SAMPLING ROUND. WELL NOT SAMPLED IN 2005.

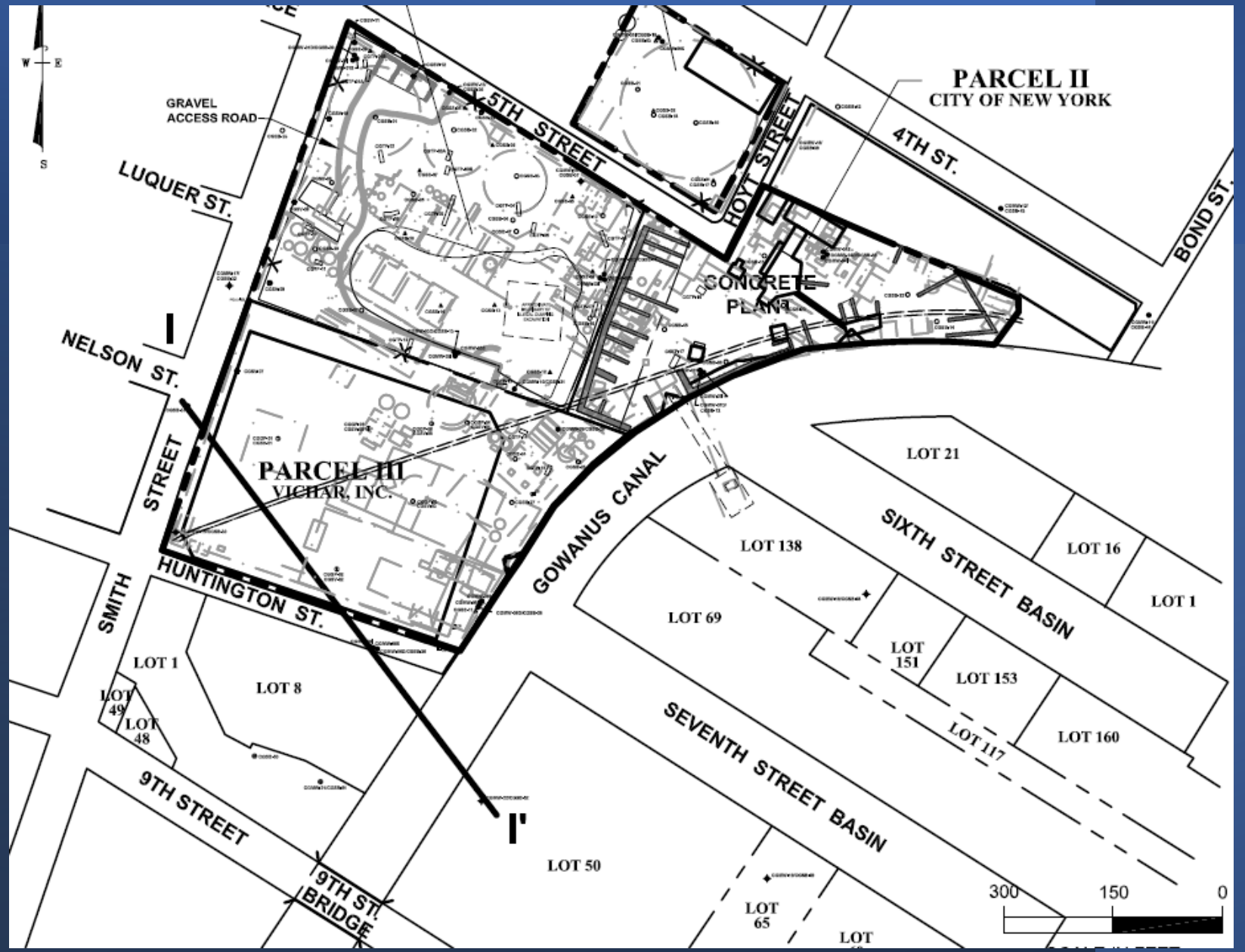

NW
A
ELEV.
FT NAVD)
PARCEL I
CITY OF NEW YORK
INTERSECTION OF
5TH & HOYT STREETS
HOLDER #1
HOLDER #2
HOLDER #3
HOLDER #4
CGSB-01
CGSB-02
CGSB-03
CGSB-37/
CGMW-14
CGSB-10
40
20
0
-20
-40
0.298
18.3
0
24.01
1290
44140
1400
1395
670
3910
1460
7564
0.0014
0.254
2168
10420
1370
1056.2
666
6435
17000
7310
1.5
5418

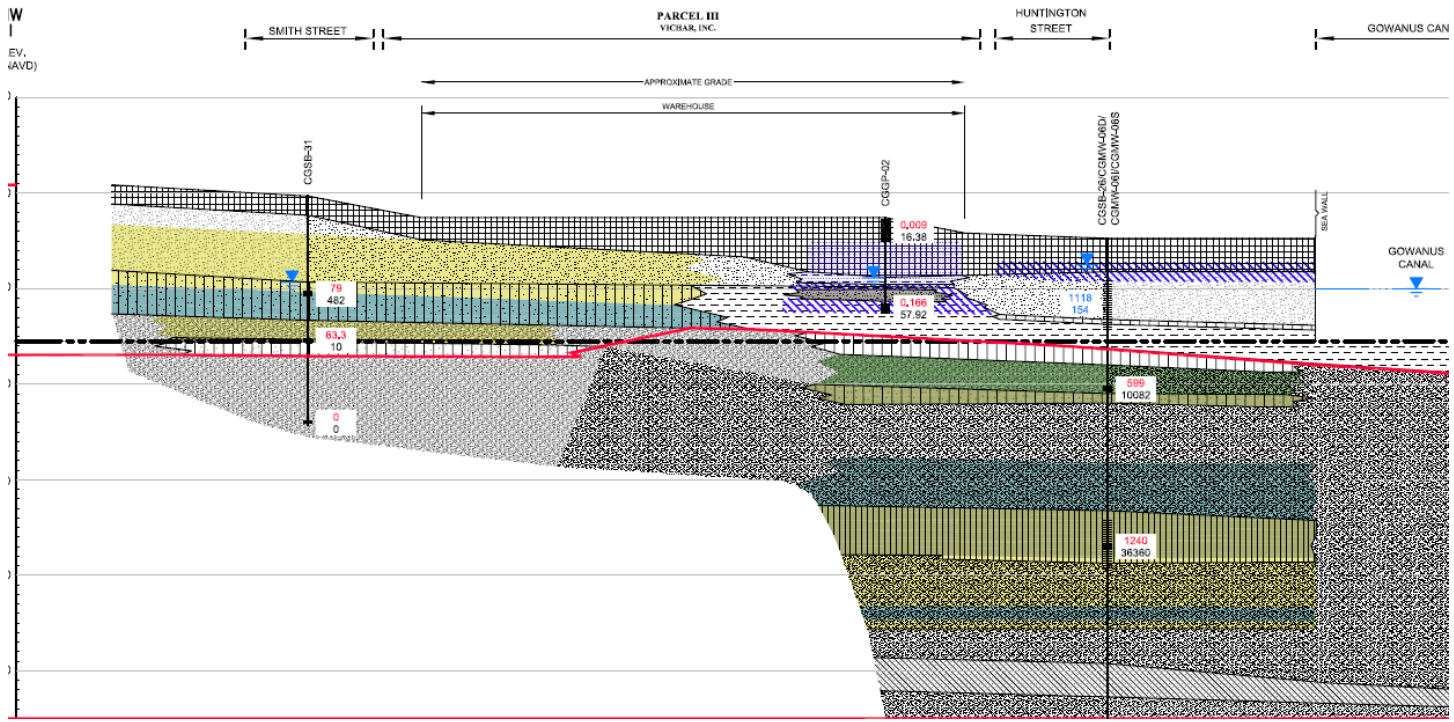

INTERSECTION OF
5TH & HOYT STREETS
PARCEL II
CITY OF NEW YORK
SE
A'
ELEV.
(FT NAVD)
40
20
0
-20
-40
CGSB-15
CGSB-16/CGMW-04D/
CGMW-04I/CGMW-04S
CGSB-22
CGSB-14
0.0369
0.785
98.8
67.7
1.61
1028.4
509.6
8270
166
12178
1450
4269
488
7220
815
14395
7.29
90.28
49400
1553
0.001


NW
B
LEV.
NAVD)
SMITH
STREET
NOTE: CGMW-13\CGSB-36 WAS
LOCATED OUTSIDE OF THE HOLDER.
PARCEL I
CITY OF NEW YORK
HOLDER #1
HOLDER #2
HOLDER #3
NOTE: CGSB-04 WAS LOCATED
OUTSIDE OF THE HOLDER.
GENERATOR
FENCE
CGSB-08/
CGMW-01D/
CGMW-01I/
CGMW-01S
CGSB-01
CGSB-36/
CGMW-13
CGSB-02
CGSB-03
CGSB-04
CGSB-47
CGSB-11/CGMW-02D/
CGMW-02I/CGMW-02S
0.298
18.3
1520
1617
188.6
1693
1290
44140
57,888
167,345
12130
7580
733
2469
670
3910
2760
2781
13300
7670
40.597
140.168
0
24.01
0.0014
0.254
940
11966
0.128
1,1814
1747
7247


PARCEL IV
ALFONSO FIGLIOLIA
PARCEL I
CITY OF NEW YORK
PARCEL II
CITY OF NEW YORK
PARCEL III
VICHAR, INC.
N
W
E
S
4TH PLACE
GRAVEL
ACCESS ROAD
LUQUER ST.
NELSON ST.
STREET
SMITH
HUNTINGTON ST.
5TH STREET
HOYT STREET
4TH ST.
BOND
CONCRETE
PLANT
GOWANUS CANAL
SIXTH STREET BASIN
LOT 21
LOT 16
LOT 1
LOT 138
LOT 69
LOT
151
LOT 1


FIFTH STREET
PARCEL I
CITY OF NEW YORK
PARCEL III
VICHAR, INC.
NE
F'
ELEV. (FT NAVD)
GENERATOR HOUSE
OIL TANK #10
OIL TANK #12
TAR SEPARATOR
HOLDER #4
CGSB-10
CGSB-11/CGMW-02D/ CGMW-02I/CGMW-02S
CGSB-46
CGSB-21/CGMW-10
CGSB-29I/CGMW-09
CGSB-24
CGSB-27
CGSB-28I/CGMW-08D/ CGMW-08I/CGMW-08S
GOWANUS CANAL
SEA WALL
40
20
0
-20
-40
-60
-80
-100
-120
UNSATURATED ZONE
SHALLOW ZONE
INTERMEDIATE ZONE
DEEP ZONE
55
790
1310
1221
57,5
4461
1940
463
650
5787
86,2
3784
21,6
40
15,97
472,2
2760
2781
1460
7564
1370
1056,2
1747
7247
33,87
2041
3,6
0
3080
18736
2010
26189
850
2582
0,24
0,212
2550
47070
0,004
0,487
0,004
0
1780
168,30
134
1617
7,8
0,6
0,001
0


PARCEL II
CITY OF NEW YORK
GRAVEL
ACCESS ROAD
5TH STREET
HOYT STREET
4TH ST.
BOND ST.
LUQUER ST.
CONCRETE
PLANT
I
NELSON ST.
PARCEL III
VICHAR, INC.
GOWANUS CANAL
LOT 21
LOT 16
LOT 1
LOT 138
SIXTH STREET BASIN
LOT 69
LOT
151
LOT 153
LOT 160
LOT 117
SMITH
STREET
HUNTINGTON ST.
LOT 1
LOT 8
LOT
49
LOT
48
SEVENTH STREET BASIN
9TH STREET
9TH ST.
BRIDGE
I'
LOT 50
LOT
65
LOT
300
150
0


W
EV.
(AVD)
SMITH STREET
PARCEL III
VICHAR, INC.
HUNTINGTON
STREET
GOWANUS CAN
APPROXIMATE GRADE
WAREHOUSE
CGSB-31
CGGP-02
CGSB-26/CGMW-05D/
CGMW-06I/CGMW-06S
SEA WALL
GOWANUS
CANAL
0.009
16.38
0.166
57.92
79
482
63.3
10
0
0
1118
154
599
10082
1240
36360

Pore Fluid Tar Saturation in Canal sediment

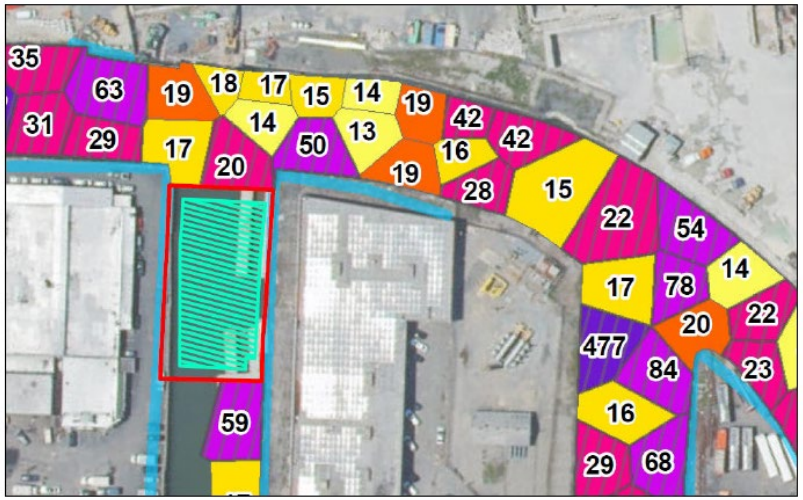
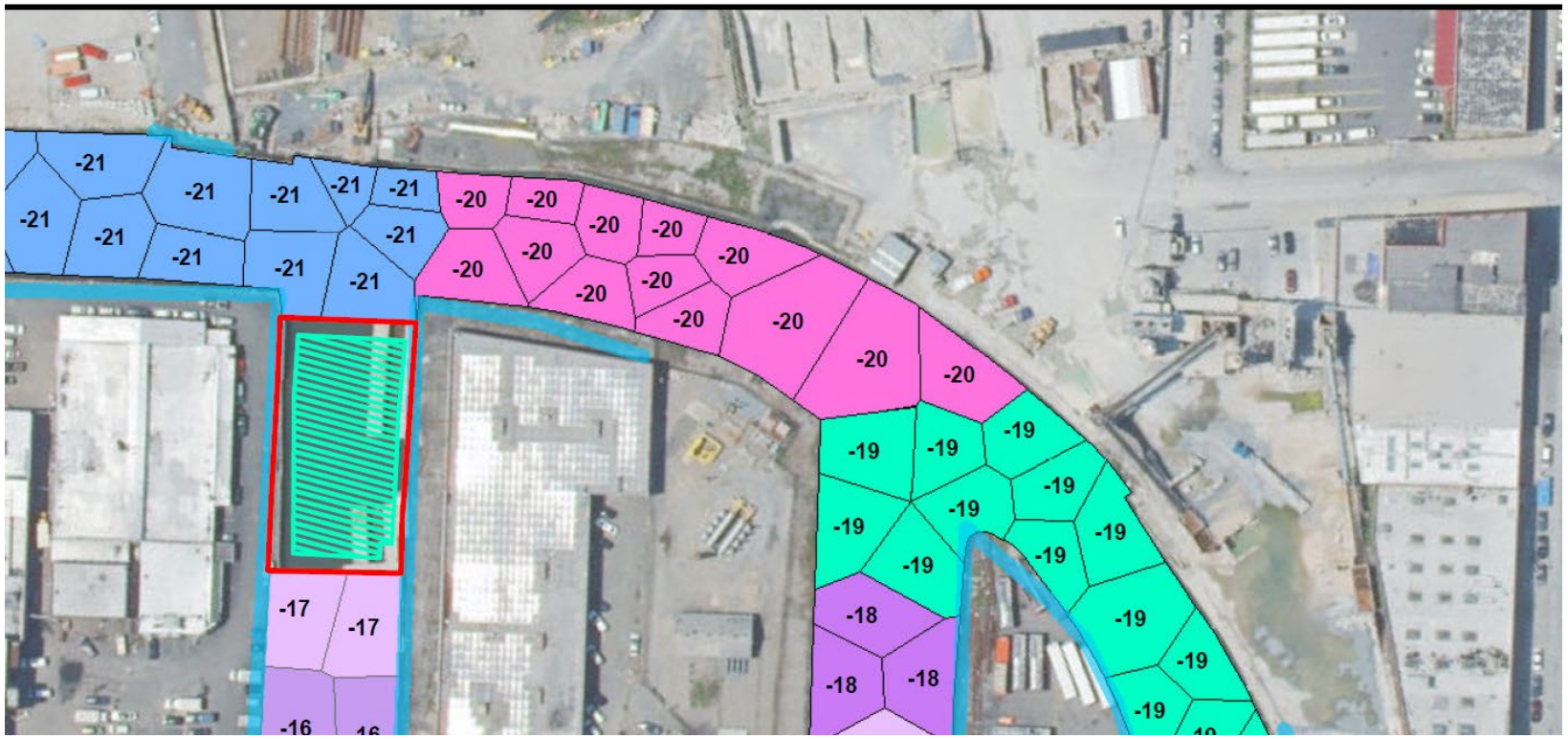
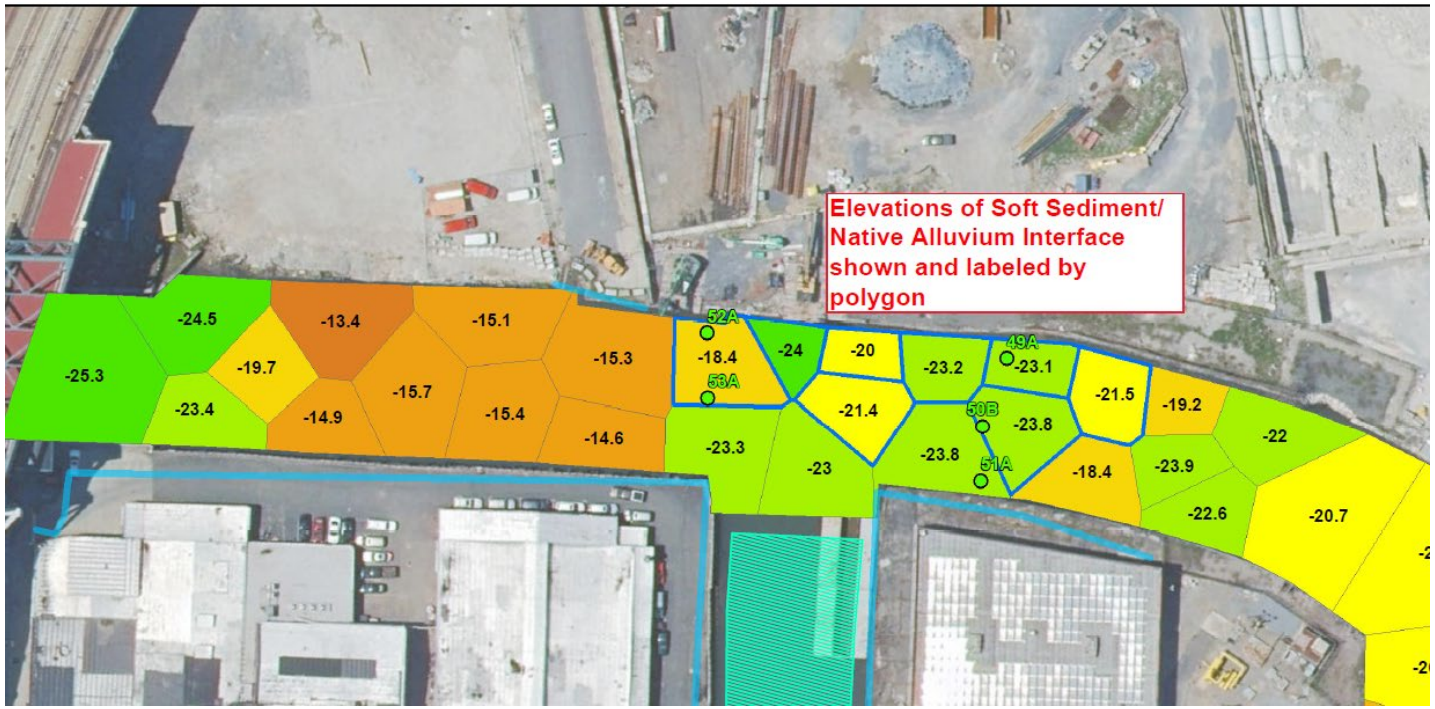


Figure 19. Screenshot of Exhibit 3 with Borderline PFS Results from VAM

Base of Cap Elevations by Public Place



Soft/Native sediment Interface Elevations



ISS Canal polygons in front of Public Place

From West 19th Street MGP Remedy

Description of Selected Remedy

Based on the results of the Alternatives Analysis and the criteria identified for evaluation of alternatives, the NYSDEC has approved the remedy for this site set forth in the Remedial Action Work Plan. The components of the remedy are as follows:

1. Excavation to a depth of 14 feet below ground surface.

2. Installation of a subsurface barrier wall. The wall will be located at the perimeter of the site on 3 sides. The new barrier will be sealed to the existing subsurface barrier previously constructed for the adjacent site (C231017) using compression grouting. The eastern wall of the barrier will a maximum 10 feet in from the property line to accommodate adjacent structural components. The barrier wall will be constructed using water tight sheet piling. If the installation of the sheet piling is not possible due to unanticipated difficulties, other technologies (slurry wall or secant wall) may be used if approved by the NYSDEC.

3. The subsurface floor and walls of the new building will be isolated from the remaining contamination. The barrier will include a cement bentonite "mud slab" at the bottom of the excavation. A waterproofing/vapor barrier will then be placed over this mud slab and on the outside of the basement walls. A concrete floor will overlay the waterproofing/vapor barrier.

4. Monitoring will be performed to demonstrate the effectiveness of the remedy in preventing contaminated soil vapor from entering the building.

From West 17th Street MGP Remedy

5/13/2008

Remedy Description and Cost

Remedy Description for Operable Unit 04

1. The western third of this property was historically part of the Hudson River and was filled using "cribbing," cages made from large timbers filled with rock and debris. Experience at nearby sites has shown this material to be very difficult to work through. In this area, a containment wall will be constructed to prevent migration of and exposure to the contamination in this area. The wall will have a low permeability, similar to a liner at a landfill).

2. Within the containment area, coal tar will be extracted to the extent possible by a series of active NAPL collection wells.

3. Coal tar impacted materials east of the cribbing and west of the highline will be treated/contained using in-situ solidification (ISS). This will create a low permeability cement monolith which will effectively isolate the MGP contamination from human contact and the environment, eliminating potential exposure pathways. Implementing ISS at this site requires conducting a treatability study, and pre-ISS excavation to clear obstructions and to allow for soil expansion. The Remedial Design will identify appropriate Construction Quality Assurance Protocols for the planned ISS activities, including mix design and testing.

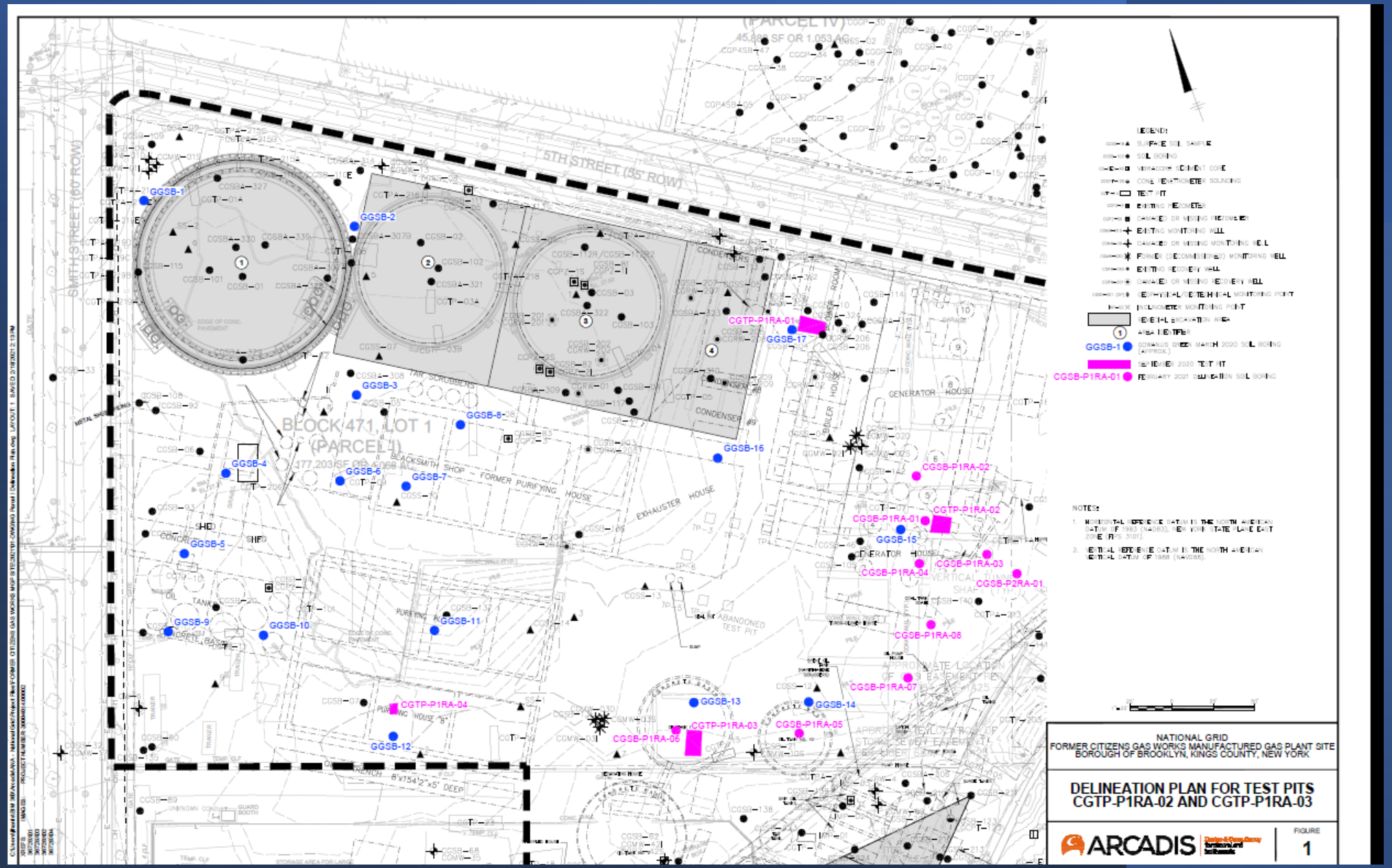
NYC OER Slide Presented to CB6 in Fall 2020

Additional Remediation

- Rezoning process will require additional hazardous materials remediation as necessary
- Development team has applied to become party to the Brownfield Cleanup Agreement
- Additional remediation would follow the current National Grid remedy and before development of Gowanus Green project.
- City and State will be involved with any post-National Grid remediation

February 2021 Investigation by National Grid

Soil Boring Designation	Screening Interval (ft bls)	Screening Observations
CGSB-P1RA-01	0 - 25	Trace dark grey to black staining, sheen, naphthalene-like odor and lenses of NAPL blebs with sheen were observed between approximately 10-14 ft bls.
CGSB-P1RA-02	0 - 25	Black staining and very faint naphthalene-like odor observed between approximately 6-7 ft bls. Trace sheen observed at approximately 15 ft bls. Trace NAPL blebs, sheen and faint naphthalene-like odor observed between approximately 20-21.5 ft bls.
CGSB-P1RA-03	0 - 25	Trace NAPL blebs, staining and naphthalene-like odor observed between approximately 5-9 ft bls. NAPL, heavy staining and naphthalene-like odor observed between approximately 10-13 ft bls. Light NAPL coating, trace sheen, staining and naphthalene-like odor observed between approximately 15-19 ft bls.
CGSB-P1RA-04	0 - 25	NAPL and naphthalene-like odor observed at approximately 5-5.5 ft bls (immediately above a 3/4-inch steel plate) and 10-10.5 ft bls. Trace NAPL blebs and faint naphthalene-like odor observed between approximately 10.5-13 ft bls and 15-16 ft bls.
CGSB-P1RA-05	0 - 25	Stained soil observed from approximately 0-4 ft bls. Light to moderate NAPL coating and staining observed between approximately 10-10.5 ft bls.
CGSB-P1RA-06	0 - 13	Viscous tar coating and naphthalene-like odors observed between approximately 7-8 ft bls.
CGSB-P1RA-07	0 - 20	Stained wood fragment and naphthalene-like odor observed between approximately 5-6.5 ft bls. Naphthalene-like odor observed between approximately 6.5-8 ft bls. Faint naphthalene-like odor observed between approximately 10-13 ft bls.
CGSB-P1RA-08	0 - 25	Trace NAPL blebs and petroleum-like odor observed between approximately 7.5-9 ft bls. Light to moderate NAPL coating, NAPL blebs, sheen and/or petroleum-like odor observed between approximately 10-14 ft bls. NAPL, heavy staining and petroleum-like odor observed between approximately 15-18 ft bls.
CGSB-P2RA-01	0 - 25	Stained soil observed between approximately 5.5-7 ft bls. Naphthalene-like odor observed at approximately 14 ft bls. Tace NAPL blebs, staining and naphthalene-like odor observed between approximately 10-13 ft bls. Heavy stained soil, NAPL, naphthalene-like and/or petroleum-like odors observed between approximately 15-18 ft bls.


5TH STREET (55' ROW)
SMITH STREET (60' ROW)
BLOCK 471, LOT 1
(PARCEL I)
177,203 SF OR 4.068 AC
GGSB-1
GGSB-2
GGSB-3
GGSB-4
GGSB-5
GGSB-6
GGSB-7
GGSB-8
GGSB-9
GGSB-10
GGSB-11
GGSB-12
GGSB-13
GGSB-14
GGSB-15
GGSB-16
GGSB-17
CGTP-P1RA-01
CGTP-P1RA-02
CGTP-P1RA-03
CGTP-P1RA-04
CGSB-P1RA-01
CGSB-P1RA-02
CGSB-P1RA-03
CGSB-P1RA-04
CGSB-P1RA-05
CGSB-P1RA-06
CGSB-P1RA-07
CGSB-P1RA-08
CGSB-P2RA-01
GENERATOR HOUSE
EXHAUSTER HOUSE
FORMER PURIFYING HOUSE
BLACKSMITH SHOP
NATIONAL GRID
FORMER CITIZENS GAS WORKS MANUFACTURED GAS PLANT SITE
BOROUGH OF BROOKLYN, KINGS COUNTY, NEW YORK
DELINEATION PLAN FOR TEST PITS
CGTP-P1RA-02 AND CGTP-P1RA-03
ARCADIS
FIGURE
1

Cleanup elements implemented to date

- Periodic removal of tar by a limited number of extraction wells behind the bulkhead (need of additional wells to be evaluated?)
- Three out of four of the original holders in Parcel I have been removed. Soil in the area of the holders has been removed to varying depths, but no deeper than Elevation 2-3 ft NAVD88.
- Soil was removed in another former MGP equipment area in Parcel III at depth Elevation -10 ft NAVD88
- National Grid, working with EPA, has installed a few hydrodynamic oil water separators; need for additional evaluation and improvement of units to include treatment media.

Conclusions about the effectiveness of the remedial actions taken at the Public Place site

1. They have not removed major tar contamination sources
2. They have not stabilized those sources to prevent mobility
3. They have not fully contained it within the site boundaries

4. As a result, there are current risks :

a. Risk to the environment (future recontamination of the canal)

b. Risk to human health (from potential vapor intrusion to buildings erected at the site following development; to neighboring buildings).

From 2007 NYSDEC Remedy

A subsurface barrier wall will be installed along the Gowanus Canal to control the migration of tar that has already migrated to depths beyond the reach of the excavation. The wall will extend inland at the northern and southern ends, and downward to a depth sufficient to prevent further movement of the remaining material off site and into the Gowanus Canal. The final wall configuration, including the need for groundwater treatment, will be determined during the design phase of this project.

From the Arcadis Supplemental Investigation

11CONCLUSION

The SDI was successful in achieving its objective of collecting the supplemental data necessary to:

- Assess current DNAPL recovery rates at the Site and design the long-term DNAPL recovery program;
- Refine the existing groundwater flow model for the Site, as presented in the *Groundwater Model for Hydraulic Effect of Proposed Remedial Alternatives* (GEI 2011c), in order to more fully evaluate 1) the effect of the bulkhead barrier wall on groundwater movement and DNAPL recovery and 2) the need for the hydraulic liner system identified in the 50% RD;

From 2020 NYSDEC ESD

4.2 Comparison of Changes with Original Remedy

The majority of the remedial components from the site's 2007 DD have been incorporated into the site's remedial design. Based on the new information discussed above, a change is proposed to the remedy to eliminate the requirement for soil excavation across the site. Since areas of shallow soil contamination remain across the site at concentrations above restricted residential use cleanup objectives, a site cover will be required to ensure that the remedy is protective of human health and the environment. Contamination that may be encountered in these areas during future ground intrusive activities would be addressed as part of the long-term Site Management Plan (SMP).

Figure 2 shows the areas of remediation at the site. The excavation remedial element (no. 2 above) will be replaced with the following, new requirement:

2. *A site cover will be required to allow for restricted residential use of the site in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of two feet of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.*

2020 State ESD failed to identify all significant changes

- The 2007 NYSDEC Remedy called for the bulkhead extending inland (wing walls) at the north and south boundaries of the site.
- The Remedy also called that “the need for groundwater treatment will be determined during the design phase of the project”
- The 50% RD by GEI had specified a plastic liner over the entire site (at depth of 8 feet) and the treatment of the water (infiltration water/groundwater in certain areas) collected by the liner.
- Arcadis evaluated the “need for the hydraulic liner system identified in the 50% RD”.
- The ESD of August 2020 by NYSDEC described only one significant change from the 2007 Remedy. Namely, excavating only 2 ft of soil, rather than 8 ft in the original Remedy, and placing a 2 ft clean soil cover.
- The ESD failed to identify these two other significant changes from the 2007 Remedy:

1. the elimination of the wing walls ; 2. The elimination of the groundwater treatment

Additional remedial work needed at Public Place

- Installation of the wing walls (length to be determined).
- In-situ stabilization of sources of tar (in various forms in soil) underneath planned development structures and in areas in the proximity of the canal (elevations and areal extent to be determined).
- Robust multilayer (vapor intrusion barriers in the foot-print of proposed structures (note School and Low EJ residential buildings).
- Water treatment units to include dissolved phase organic compound treatment media, such as GAC.

Gowanus Canal Record of Decision (ROD) Statutory Determinations

The ROD Statutory Determination for the MGP sites require that these sites meet the following (p. 91 of the ROD):

"The upland former MGP facility source controls (and other upland source areas) that have been or are anticipated to be selected by NYSDEC **are expected to be protective of human health and the environment by controlling the primary source areas and minimizing the migration pathways into the canal."**

EPA's ROD requirements for source control of the upland MGPs at the Gowanus Canal

The Selected Remedy section of the ROD states(page 83):

Source Controls

In order for the selected remedy in the canal to be effective, sources that could recontaminate the canal must be addressed. The upland sources of contamination, including the former MGP facilities, ……will be addressed prior to the commencement of, or in phased coordination with, the implementation of the selected remedy.

……

"…**In the unlikely event that a** timely and **effective state-selected remedy is not implemented at a given former MGP facility, the EPA may implement actions pursuant to CERCLA** to ensure the protectiveness of the selected remedy."